The American Academy of the History of Dentistry, a not-for-profit organization founded in 1951, has as its goals the following:

- Increasing interest among dentists in dental history.
- Encouraging dental schools to develop historical collections on dentistry, and to offer adequate instruction in dental history.
- Developing a broader understanding of the facts of dental history among the leaders in dentistry in order to aid them in their attempts in solving important problems in dental education and practice.
- Stimulating more thorough and comprehensive research in dental history, thereby extending the boundaries of dental knowledge, giving substantial support to growing professional culture.
- Creating an authoritative body to which important questions relating to dental history could be referred for factual verification.
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Obituary: Ms. Aletha Kowitz

Aletha Kowitz brought to our Academy not only her deep passion for history, but most notably, her expertise in library science. The ability of any historian to pursue one’s research interest is heavily dependent on navigating through the extensive body of written literature. Aletha contributed greatly in providing dental historians road maps facilitating their research. Her works, including Dental Journals and Serials: An Analytical Guide; a bibliography of the ADA Rare Book collection; and her collaboration with Dr. Hannelore Loevy, Dentistry on Stamps, are still valuable reference material for individuals conducting dental history research. However, it was her personal encouragement and individualized referencing services she bestowed on all who came to her for assistance for which she will be best remembered by those of us fortunate enough to have been the recipients.

Aletha always conducted herself as the ultimate librarian professional. She worked at the ADA’s Bureau of Library Service for 22 years. She was promoted to director for her last 15 years there,
retiring in 1992. Towards the end of her tenure, she was exposed to the beginning of the electronic age in librarianship, and understood the dramatic change necessary for the Library. She facilitated a seamless transfer to the current director, Ms. Mary Kreinbring, who recalled Aletha’s kindness, support and advice at that time.

Ms. Kowitz worked tirelessly with Dr. Loevy to elevate the integrity of our Journal. She was intimately involved in the labor-intensive process of verifying the references in articles submitted for publication. Additionally, prior to the recent development of digitized indexing, she produced consecutive five year annual indexes for our Journal. Under the stewardship of both Dr. Loevy and Ms. Kowitz, the number of institutional subscriptions expanded, requiring Aletha to undertake additional management duties.

Ms. Kowitz held every executive position in our Academy, including the underappreciated Secretary-Treasurer role for 13 years. She became the first non-dentist and woman elected president of our Academy, and was honored with the Hayden-Harris Award in 1997. Medical librarianship was established primarily by “physician-librarians,” however, the technical and organizational development of the field was dependent on individuals such as Aletha. How fortunate for the dental profession and our Academy that we could benefit from someone of her caliber and dedication.

The only passions that trumped her profession and dental history were her dedication to her family and to her deep spiritual beliefs.

On a personal note: Aletha and I talked weekly, as she provided guidance and counsel during my transition into the presidency of our Academy and editorship of the Journal. She always presented the facts first—but when asked, she would provide her opinion. I wish to share part of my last correspondence with Aletha (written in a strong hand and perfect penmanship):

February 3, 2011
Dear David,

I am finally getting a bit organized. I found that the move to the nursing home followed by bed rest and hospitalization a bit much to handle... I believe that my Fall issue of the Journal of History of Dentistry may have not be forwarded to my new address. Will you please send it to me? I miss it.

Best wishes for a healthy and successful 2011.
—Althea

Though I shall miss her kindness, generosity, humor and professional knowledge, Althea’s literary contributions and spirit will continue to guide us and future dental historians in preserving and expanding our knowledge of dental history.

—David A. Chernin, DMD, MLS
Editor, Journal of the History of Dentistry
Various forms of periodontal therapy, including surgery, have been advocated and documented in the dental literature during the last three centuries. This variety of treatment modalities has been developed to address the anatomical consequences (pocket formation and bone loss) sustained from chronic periodontal disease. The marked differences in techniques have created significant controversies between the greatest leaders in dentistry and their equally influential disciples. Nevertheless, these leaders have always shared a common goal: the preservation of the natural dentition in a harmonious environment of health, comfort, and proper function. This article discusses the history of periodontal osseous surgery, including not only the technical issues, but also the conceptual underpinnings of this form of therapeutic intervention.

In the process of examining this subject closely, three main controversies in the field of periodontics are brought into sharper focus: non-surgical versus surgical periodontal therapy; gingivectomy versus osseous resective periodontal therapy; and the nature of clinical decision-making: scientific and evidenced-based versus subjective clinical judgement.
Introduction

In 1942, Dr. Arthur Hastings Merritt (Fig. 1), brought to the attention of dentists across America the controversy surrounding the issue of whether periodontal surgery alone (radical treatment) or scaling/root and gingival curettage procedures alone (conservative treatment) should be employed in the management of patients exhibiting signs and symptoms of chronic periodontitis.\\n
About 1860, John M. Riggs,* a practicing dentist in Hartford, Conn., claimed that scurvy of the gums [periodontoclasia] as it was then called, could be cured, and its treatment was surgical and not therapeutic. His use of the term ‘surgical’ has led to some misunderstanding, creating the belief that he employed surgical measures such as are in use at present. What he really meant was that its treatment was by instrumentation rather than by the use of drugs, which from time immemorial had been the usual treatment.

…From that day to this, the operation initiated and taught by Riggs has, with many refinements, held the center of the stage. This operation, which has since come to be known as subgingival curettage, consists in passing an instrument—curet, plane or file—into the pocket and bringing it to bear on the surface of the root in such a way as to remove anything of a foreign or septic nature that may be upon it, leaving a smooth and polished surface. In pockets that are accessible and not too deep, excellent results are obtained in this way. Many still regard it as the operation of choice.

It is, however, a difficult operation. To remove from a surface that cannot be seen whatever there may be upon it of a foreign nature is always an uncertain and in some instances an impossible operation. It has, moreover, another disadvantage. Unless reattachment occurs, which is the exception and not the rule, the pocket will continue, with the possibility of reinfection later. In non-cooperative patients and those not under constant supervision, this is a situation which needs to be seriously considered in deciding what form of treatment should be undertaken in a given case. It is this uncertainty in cases fairly well advanced that has caused those engaged in the practice of periodontia to consider the possibilities of surgery.

Out of this situation, there grew up two schools of thought, the conservative and the so-called radical. Neither understood the other. The conservative group knew little of surgery and its possibilities, and the so-called radicals had, as a rule, never mastered the technic of subgingival curettage. The upshot of this was that one group treated all cases by subgingival curettage, while the other employed surgical measures.

Fortunately for all concerned, there has grown up a third group, which has mastered the technical procedures in both fields and, instead of using one to the exclusion of the other, is guided in its treatment by the nature of the case. This is as it should be. Surgery has a legitimate place in periodontia as it has in ophthalmology or rhinology. It is its abuse, not its use, that is to be deprecated.

In Dr. Merritt’s opinion, dentistry had matured to the point where prudent clinicians needed to appreciate the advantages and limitations of both clinical traditions and decide when to employ each or both, the final decision being based on “the nature of the case.” The resolution of this controversy, however, signaled by the publication of this prescient article, ushered in a new era (1940’s-1980’s) with its own new controversy—namely, what kind of surgery is best suited to managing and eliminating the periodontal pocket.

History of the Osseous Surgery Technique

The history of the osseous surgery technique is intimately related to the concept that pocket elimination is a desirable and achievable benchmark in the successful clinical management of periodontal disease. Periodontitis is an infection of a mixed bacterial etiology modulated by the evolved host defense mechanisms; this interplay between externally derived noxious chemical substances and those “protective” chemical substances elicited by the host, lead, on a frequent basis, to two significant architectural problems: supporting bone loss, and pocket formation.2-6

The periodontal pocket can be thought of as an area of tissue detachment from the root surface. A visual analogy would be a person’s finger nail separating from the skin of the finger if there was an infection under the nail. Once this deepened space extends beyond 3-4mm, adequate mechanical debridement of the enamel or root surface becomes less predictable, if not impossible. A vicious cycle is thus created and sustained: the inability to thoroughly remove food debris and bacterial plaque from the tooth surface leads to pocket formation initially, and then the persistent depth of the pocket significantly hampers a patient’s ability to cleanse the root surfaces of bacterial plaque, leading to further deepening of the pocket.

Contrary to common beliefs, no study has been able to substantiate the concept that pocket elimination or reduction surgery is mandatory for the success of therapy or for easy maintenance on a long term basis.7

While it remains true that there is no “scientific evidence” that justifies surgical pocket elimination as a necessary requirement for prolonging the useful lifetime of the natural dentition, it is equally true that there are many advantages to be accrued by obtaining a pocket-free periodontium. These post-surgical advantages are tangible to patients and dentists alike, and frequently outweigh the many very real disadvantages associated with periodontal surgery.8-14

During the last 90 years, numerous American clinicians, such as Drs. Kirkland, Merritt, Glickman, Prichard, Schluger, Amsterdam, Friedman, Ochsenbein, Goldman, Cohen and Kramer reached a similar conclusion: a rock-solid realization that some clinical imperatives supersede all other considerations. Here is a list of six of these imperatives that have stood the test of time.15-30

Clinical Imperatives Associated with a Pocket-Free Periodontium

1. With the re-establishment of normal sulcus depths (albeit at a more apical position), access is provided to bacterial plaque deposits on the root surface previously covered up by inflamed pocket walls. Access is also provided to any areas of root caries if present.

2. Elimination of deep pockets facilitates supportive therapy programs: coronal scaling and polishing is much easier for the dentist or the hygienist to perform when there is pocket elimination as compared to subgingival scaling of numerous deep periodontal and gingival pockets.

3. Surgical pocket elimination is a strategy (not a necessity) employed to help prevent further clinical attachment loss (CAL). Once a patient develops periodontal pockets, the future rate of attachment loss is totally unpredictable; it may be slow or rapid, progressive or episodic. Pocket elimination removes this uncertainty by the re-establishment of a cleansable (healthy) dento-gingival junction.

4. Pocket elimination will give some patients a sense of empowerment: a sense of personal control over the destiny of their dental health. Many patients want the chance to save their teeth, they want the information that will help them save their teeth, and they want to assume the responsibility to take better care of themselves.
5. Pocket elimination will enhance a more favorable long term prognosis for necessary dental restorations such as crowns, bridges, removable partial dentures, inlays, onlays, and laminates.

6. Pocket elimination may reduce the systemic disease risk associated with chronic high levels of bacteremia (e.g. coronary artery disease, pre-term delivery, diabetic control). Tolerating or creating a “mausoleum of gold over a mass of sepsis” is not in the patient’s best interests.\textsuperscript{31,33}

### Early Concern With Necrotic Bone

The purposeful sacrifice of crestal portions of the alveolar process has been advocated by numerous clinicians faced with the treatment of chronic inflammatory marginal periodontal disease. An understanding of the pathogenesis of periodontitis from a histological perspective was first presented in the dental literature in 1902, by Dr. N. N. Znamensky. Originally from Moscow, Dr. Znamensky reported on his observations and research made during his tenure at the esteemed Pasteur Institute in Paris during the 1890s.\textsuperscript{34} In his article, “Alveolar Pyorrhea: Its Pathological Anatomy and Its Radical Treatment,” (Fig. 2) he visually demonstrated the histological realities of periodontitis and described the presence of a cellular infiltrate in the inflamed gingival tissues (Fig. 3). This infiltrate starts to form initially in the gingival marginal area and then extends deeper as the disease process progresses apically, causing bone resorption associated with multinucleated cells (osteoclasts) located in Howship’s lacunae. Unfortunately, in the detailed discussion of his therapeutic protocol of more advanced lesions, he employed the term “dead bone fragments” (sequestra).\textsuperscript{34} (Fig. 4)

The whole picture of the anatomo-pathological alterations exhibited in their gradual course, shows very distinctly that the development of an alveolar pyorrhea proceeds from the periphery to the centre, i.e. primarily inflammatory phenomena originate in the gum and then successively pass into the very bone and periosteum of the socket.

This process is not an atrophical one, but a chronic inflammation; the secretion of pus (at the same time with a loosening of tooth and a denuding of the root in consequence of the disappearance of the socket at a certain stage) I consider to be one of the cardinal symptoms of the ailment…The above described microscopical pictures show that we have here to do with a rarefying inflammation—\textit{ostitis rarefaciens}. It begins from the free edge of the socket and advances by degrees into the depth, extending itself not only lengthwise but on all sides, even in the body of the jaw.

My clinical experience (742 cases/2,415 treated sockets) confirmed me in the opinion that when there is no general disorder (as tabes or diabetes), the scraping out of the affected bone of the socket and gingival sac is the only rationale means for a radical and rapid treatment of pyorrhea alveolaris… the scraping out with a spoon-shaped excavator was proceeded with, till the bone got quite smooth. In all, the work with each socket took from 5-15 minutes, according to the degree the bone was affected. In cases of deeply affected bones, when the acting instrument went too deep into the thickness of the bone (more than a centimeter from the upper front teeth—one could not, of course, succeed in scraping out the whole diseased area to perfect smoothness at once, so in these cases, sometimes a few months after, the operation around those teeth was repeated. The scraped out particles present a granular tissue, wherein there are to be found some fragments of dead bone sensible to the touch when rubbed between the fingers, just as in a rarefying ostitis.

This very specific idea of the presence of necrotic bone, underlying periodontal pockets, permeated the thinking of a generation of dentists during the second, third, and fourth decades of the 20th century, and led directly to the advocacy of periodontal flap surgery, a procedure designed to access the alveolar bone. The following clinicians were at the forefront of recommending surgical flap elevation and removal of necrotic and sequestered portions of the alveolar processes: Drs. A. Cieszynski of Poland; R. Neumann of Berlin; and Drs. A. Zentler, A.M. Nodine, J. Zemsky and O. Kirkland of the US.\textsuperscript{35-37} Dr. Leonard Widman, from Sweden, also advocated surgical flap management of periodontal pockets, but did not remove crestal bone because it was necrotic; rather, it was occasionally reshaped to allow for better flap re-adaptation.\textsuperscript{38}
Photo-micrograph of gingivitis reveals profound inflammatory cellular changes (accumulations of neutrophils, lymphocytes, plasma cells) limited solely to the peripheral gingival anatomy. Underlying crestal bone tissue is not inflamed; it is covered by a healthy layer of connective tissue. Note calculus deposit immediately adjacent to the inflammatory gingival changes.

Photo-micrograph of periodontitis reveals the non-marrowed part of alveolar bone is being replaced by osteoid tissue, as inflammation is established in the deeper portions of the alveolar process. The separated islets of bone have begun to get decalcified, and are forming sequestra. Inflammatory phenomena originate in the peripheral gingival tissues and then over time, successively pass into the deeper bony structures and periosium.
The Influence of the Vienna School

It remained for two outstanding members of the “Vienna School,” Drs. Rudolph Kronfeld (Fig. 5) and Balint Orban (Fig. 6), to present additional histologic evidence in the mid-to-late 1930s that finally refuted the idea that the alveolar bone adjacent to periodontal pockets was necrotic.

From Dr. Kronfeld:39

The only changes found in the alveolar bone in the vicinity of pyorrhea pockets are those of osteoclastic resorption…all of the histologic characteristics of bone resorption could clearly be observed in our specimens. The presence of large irregular multinucleated cells (osteoclasts), lying in Howship’s lacunae on the bone surface, is the main histologic characteristic of resorption…by this process of resorption some bone trabeculae are entirely eliminated and others are thinned; thus the total amount of bone is diminished, but the structure and composition of the remaining bone substance is not altered… The alveolar bone in cases of pyorrhea is inflamed; it is in a state of osteitis with extensive osteoclastic resorption, but it is certainly not necrotic…The process of bone resorption may be replaced at any time by new bone formation, providing that the etiologic factor for resorption has ceased to act and providing the organism is capable of instituting reparative changes. Applying this principle to the bone beneath a suppurating pocket, it is certainly possible for the bone to regenerate after the cause of the bone destruction, namely, the progressive inflammation of the overlying tissues, has been eliminated.

And from Dr. Orban:40

If there is any inflammation of the gum, as is so often the case, especially in pyorrhea, the bony crest is irregularly resorbed and may be farther away from the bottom of the pocket than under normal conditions. This relationship between bone and pocket is important because some operators seem to believe that, in pyorrhea, some bone becomes exposed and that it is necrotic or infected, and in gingivectomy it therefore must be removed. If the gingivectomy is properly performed, that is, if the free margin of the gum is removed to the bottom of the pocket, no bone can be exposed. In pyorrhea, the bone is never necrotic. It may be rarefied and irregular, but not necrotic. Neither is it infected…Gum inflammation is a tissue reaction to local irritation, such as tartar formation and the action of bacterial toxins from the bottom of the pockets, local traumatic injuries from coarse food, food impaction, ill-fitting restorations, etc. On removal of these irritating conditions, disappearance of the reactive granulation tissue and healing of the epithelial covering of the gum margin can be expected.

In flap operations, when the alveolar border is exposed, we can often see that the alveolar margin as compared with deeper layers of the bone, has a red appearance, which is often considered to be due to the process of infection. This, however, is not the case…There is no reason to remove this bone, as it is not infected, and the fibrous marrow will be changed to fatty marrow when the infection and inflammation subside.

The “Vienna School” was established under the charismatic leadership of Dr. Bernhard Gottlieb (Fig. 7) in the 1920’s; its most well-known members who emigrated to America in the late 1930’s were Drs. Balint Orban, Harry Sicher, Joseph P. Weinman and Rudolph Kronfeld.

The Third Reich’s barbaric invasion and occupation of Austria in March 1938, and the following Blitzverfolgung (“lightning persecution”), with its egregious injustices, signaled to all Jews that their equal participation in Austrian society was rapidly coming to an end, no matter the worth of their past contributions. Those with financial resources and good connections to outside communities in America, Asia, South America, Palestine and England were able to escape; however, most Jews were trapped and perished. Dr. Gottlieb and many of his students and teaching colleagues were fortunate, indeed, to find a new home in America, where they could continue to make valuable contributions to the advancement of the “biologic approach” to dentistry. America
and its countless dental students were equally fortunate, becoming beneficiaries to be educated in the principles of the Vienna School, in spite of the painful personal tragedies these immigrants were forced to endure.\textsuperscript{41,42} When the dire emergency presented itself, William H. G. Logan, the Dean of the Loyola School of Dentistry in Chicago, seized the opportunity and was: “...able to invite the Vienna School \textit{en bloc} to work in Chicago. This was to completely change the face of American dentistry by welding the biological approach of the Austrian scientists to the renowned technical excellence for which American dentistry was known.”\textsuperscript{42}

This remarkable group of dentists, formally trained in medicine prior to entry into dentistry, assiduously labored to explain all clinical phenomena in terms of histological changes, whether physiological or pathological in nature. Their contributions mimicked those of Bichat, Kolliker, Conheim, Metchnikoff and Virchow, which had served to re-orient clinical medicine in the 19th century to the histological perspective.\textsuperscript{43,44}

Without belittling the significance of the clinic for the investigation of a disease, we are still forced to insist on the most exact regard for the pathological anatomy as an obvious and urgent pre-requisite. All authors who have left this condition unfilled have been building only upon sand. This holds good especially for the decision of the long contested question of the etiological relationship of the two chief symptoms of pyorrhea alveolaris—the absorption of the bone and the suppurative exudate from the gingival pocket.\textsuperscript{45}

For a list of the more significant publications from this group, see Appendix A, page 88.

Born in Poland in 1886, Dr. Gottlieb attended the prestigious medical school at the University of Vienna, graduating in 1912. After serving in the Austro-Hungarian army in WWI, he returned to Vienna. Dr. Gottlieb not only established a private office for the practice of dentistry in the years 1917-1918, but also assumed the responsibilities of leading the University of Vienna’s Dental Institute. As director of the Dental Institute, Dr. Gottlieb promulgated a “kind of Talmudic ethic of inquiry.”\textsuperscript{46} Through the sheer force of his personality and brilliance of mind, he guided and challenged his team of young researchers, extolling the virtues of diligence, scholarship, and meticulous histological technique. Their combined efforts served to dramatically enhance the reputation of Gottlieb’s Dental Institute, and by the mid 1920’s, it reached the very highest caliber of international distinction.\textsuperscript{42,45,46}

Although Gottlieb’s contributions to our understanding of the structure and function of the teeth and oral soft tissues was significant, his greatest legacy to dentistry may have been the tradition of careful systematic inquiry his leadership instilled. His career, and the careers of the students and colleagues who had worked with him in Vienna, enriched the scientific foundations of dentistry and perhaps even more significantly, helped lay the foundation for a vigorous research enterprise in the United States.\textsuperscript{5,46}

The accomplishments and contributions of the Vienna School (Fig. 8) to the literature are too numerous to list; however, a very short sampling of the more important concepts that proved to be so influential on their dental colleagues in America, their new home, might include:
The Two Main Methods of Surgical Pocket Elimination

Originally attempted by Pierre Fauchard in the 18th century and Karl Robiscek in the late 19th century, the surgical gingivectomy was reintroduced by Pickerill in 1912. Three years later, G.V. Black also described this type of surgery in his book *Special Dental Pathology*, published in 1915. The gingivectomy was specifically designed to eliminate the fibrotic pocket walls associated with long-standing gingival or periodontal pockets; with this procedure, absolutely no attempt was made to alter the underlying crestal bone.

From Pickerill (quoted in Madison):

‘The calculus is rapidly removed, laceration of the tissues does not matter in the least and the hemorrhage is controlled by an assistant. Then, by means of special curettes, curved scissors, etc., the whole of the infected tissue is removed, applications of tincture of iodine are made frequently, and massage is undertaken as soon afterward as possible. The patient is put upon a mixed diet of fibrous and acid carbohydrates, proteins, and extractives being reduced to a minimum.’

From G.V. Black (quoted in Madison):

‘In many cases, the best method is to partially or entirely eradicate the pocket by cutting away the gum tissue that is undermined by the disease of the periodontal membrane. This should be cut away as far as the greatest depth of the margin of the alveolar process as well as the soft tissue, since the detachment of the periodontal membrane from the cementum us usually in advance of the destruction of the bone.’

The members of the Vienna School were eager to endorse this surgical procedure because it encouraged gentle surgical handling of bone tissue and patience with the possibilities of bone remodeling and healing once the overlying inflamed gingival tissues were removed. In fact, it was the very strong and clear endorsement by the clinicians of the Vienna School that proved to be the decisive element in catapulting the gingivectomy into great clinical prominence in America during the 1940’s to the late 1970’s.

The gingivectomy procedure thus became the dominant periodontal surgical procedure, endorsed by the histologically-oriented dentists.
and periodontists of the time. During the 1940’s and 1950’s, however, after several years of clinical experience with this procedure, the limitations of the procedure, in terms of the inability of the gingivectomy to actually lead to pocket elimination on a consistent and sustainable basis, became more frequently observed. Outspoken critics of the procedure introduced the new concept of “plastic repair” and re-emphasized the need to gain access to the crestal bone; access was necessary so that the crestal bone could be altered in form, not because it was necrotic, but because its re-shaping would enhance the clinical achievement of pocket elimination.

**Introduction of the Concept of Plastic Repair: A New Approach to Pocket Elimination**

Eighteen years following the introduction by Dr. Simonton in 1925 of periodontal probing for determining the level of the epithelial attachment on the enamel or cemental surfaces, clinical expertise had advanced to the point where many clinicians understood the minute distinctions between gingival pockets and periodontal pockets, and between suprabony and intrabony periodontal pockets. This slow maturation of clinical sophistication and awareness was reflected in an outstanding contribution to the literature by Dr. Charles H.M. Williams (Fig. 9), of Toronto, Canada. In his 1943 article entitled “Rationalization of Periodontal Therapy,” Dr. Williams succinctly outlined the varied causes of pocket formation and presented a rational approach to their clinical management. (Figs. 10-12) While all pockets were considered worthy of treatment, he presented with great clarity the main rationale for resective osseous surgery.\(^{51}\)

...Most of the many techniques and materials which have been suggested for pocket therapy have some degree of value when properly applied but application of a single method of treatment for all pockets is ineffective in some conditions and unnecessarily tedious, or too radical in others. The high degree of efficiency which has been attained in the technique of preparing and filling carious cavities in teeth is undoubtedly largely the result of the rational system outline by Dr. G.V. Black.

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**Fig. 9. Dr. Charles H. M. Williams**

...Accurate determination of the position and extent of periodontal pockets is essential if a rational system of treatment is to be applied successfully. It is also necessary that accurate records be made of the original extent of periodontal pockets so that the operator may be able to assess the value of the various methods of pocket therapy which are employed... On the basis of clinical observation there are two main types of periodontal disease. Periodontitis simplex exhibits an even distribution of lesions, relatively horizontal alveolar edge and relatively shallow pockets. In its later stages this condition tends to show marked resorption of the bone edge and recession of the gingival tissue but the pockets are still shallow. Periodontitis complex exhibits irregular distribution of lesions, “vertical” bone loss and deep pockets...atrophy of the gingival tissue keeps pace with the apical movement of the bone edge when the bone edge remains horizontal or is broadly irregular and gingival tissue fails to atrophy when the bone edge is sharply irregular.

This observation of the natural control of crevice depths seems fundamental to the whole problem of production of recession in periodontal pockets. Intentional modification of the contour of the bone edge to render it more nearly horizontal is frequently the "extension for prevention of recurrence" phase of the technique for producing recession. In the writer's experience a large percentage of periodontal pockets of narrow type recur unless this phase of operative treatment is carefully performed...

It was formerly assumed that the irregular bone masses contiguous to periodontal pockets were necrotic and should be removed to prevent reinfection of the area and consequent re-establishment of the pocket. The premise was faulty (the contiguous bone is rarely necrotic) but
Fig. 10. Figure 1 in Williams’ “Rationalization of Periodontal Therapy.” The original caption reads: “Figure 1. Atrophy of gingival tissue. Resorption of the bone edge over a broad area is favorable to recession of the gingival tissue and the maintenance of a shallow sulcus.
A. gingival margin B. edge of bone.”

Fig. 11. Figure 2 in Williams’ “Rationalization of Periodontal Therapy.” The original caption reads: “Figure 2. Failure of gingival tissue to atrophy. Resorption of the bone edge over a narrow area and with sharply irregular pattern is unfavorable to atrophy of gingival tissue and favorable to the establishment of deep periodontal pockets.
A. gingival margin B. edge of bone.”

Fig. 12. Histologic photomicrograph from Williams’ “Rationalization of Periodontal Therapy,” demonstrating localized angular bone loss and deep true periodontal pocket formation on the mesial aspect of molar tooth. Note apical locations of both calculus and epithelial attachment on the molar root; compare to distal of the premolar root.
the clinical observation and the technique when judiciously applied are, in the opinion of the writer, sound. Removal of normal or nearly normal bone in some operations for producing recession is of course no more pleasant, but it is just as necessary, as the removal of some normal tooth structure in the preparation of cavities in teeth.

Along with previous contributions to the dental literature by Dr. R. Neumann from Berlin in the 1920’s and Dr. F. A. Carranza, Sr. from Caracas, Venezuela, in the 1930’s, this seminal article laid the ground for all later work in this nascent field of osseous surgery.

By the end of the decade, Dr. Saul Schluger (Fig. 13), a charismatic teacher and perceptive clinician at the Columbia University School of Dentistry in New York City, expanded on the work of these earlier clinicians, and in 1949 reintroduced the concepts of plastic repair and osseous surgery to a wider American audience. There is no doubt that Dr. Schluger, because of his enduring commitment to teaching and his provocative methods of motivating his students, proved to be the most influential of these clinicians and can be given credit for “popularizing” the technique and establishing it as a basic principle in pocket elimination surgery.

Surgery should be resorted to only when the pocket cannot be eliminated by conservative means or when time is an important factor in treatment…where conservative treatment is feasible it is preferable to surgery, but the one constant in treatment must be pocket elimination by any means before a patient may be dismissed as cured. It is, of course, well known that some of our most accomplished periodontists limit themselves to a great extent to the conservative approach, and, in those patients who do not yield pocket closure as a result of treatment, will keep teeth in use for many years which have considerable crevicular depth. These patients frequently break down rapidly, need constant and meticulous office treatment, and present at times a waiting and potential nidus for reinfection. The retention of teeth with deep sulci militates against that point of view as a basis for treatment.

We have at hand the gingivectomies for the elimination of the pocket. In performing a gingivectomy we attempt to create a selective recession where there exists a deeper than normal sulcus. All gingivectomies should be judged by the ease with which this selective recession is achieved and by the permanence of the result… the gingivectomies in general, however, consist of a careful resection of unsupported soft tissue to the level of the remaining bone. There is some distinction made between the base of the pocket and the bone level in some techniques as far as the depth of the resection is concerned, but they are almost exclusively directed toward the excision of soft tissue only… the one fault common to all these operations is the lack of adequate diagnosis.

While the extent of soft tissue involvement is adequately noted, little if any interest is shown the form and status of the bone in the operative field. It is true that in the gingivectomies soft tissue is resected to this bony profile, but the profile itself is not altered… It has often been observed that there is postresection regrowth [following gingivectomy] of soft tissue beyond the crevicular depth regarded as normal. This regrowth occurs interproximally and under certain conditions, on the buccal or lingual as well. No explanation has ever been offered for this regrowth— and loss or compromising of the desired result— beyond the usual one of a possible lack of home care on the part of the patient. Inadequate postoperative home care will allow the proliferation of tissue to take place which will negate the beneficial results of the gingivectomy; however, all cases of proliferation cannot be explained on that basis.

If we observe the bony configuration of the alveolar bone, we can readily see that sharp geometric configuration is frequently found wherever periodontal destruction is localized to a small section or sections of an area. This loss of bone is not a regular pattern but presents sharp deviations from the expected bone profile. It is at times sharply localized, even about portions of a single small root. Bone, being hard, inelastic tissue, seems to have no difficulty in maintaining these deep geometric, almost jagged variations in form on a permanent basis. Superficial gingival tissue, on the other hand, does not follow such an outline permanently…

The pattern of behavior of the soft tissue is conditioned...
Fig. 14. Figure 2 from Schluger’s “Osseous resection: a basic principle in periodontal surgery.” Original caption reads: “Fig. 2. This type of pocket is common on the mesial aspect of titled second molars. Note the sudden angular dip in the bone profile to the base of the pocket. See Fig. 3.”

Fig. 15. Figure 3 from Schluger’s article. Original caption reads: “Fig. 3. Recommended line of incision in the bone in the case presented in Fig. 2. The soft tissue should be reflected to permit this reduction.”

Fig. 16. Figure 4 from Schluger’s article. Original caption reads: “Fig. 4. Same case as Figs. 2 and 3 with the bone reduced to a gradual slope to eliminate the pocket.”

Fig. 17. Figure 5 from Schluger’s article. Original caption reads: “Fig. 5. Illustration of an extremely deep pocket interproximally between the right cuspid and the first premolar. The dotted line represents the line of incision to be followed in the bone and soft tissue. Note the clinical case presented in Figs. 6 and 7.”

(not pictured, Figs. 6 and 7)

Fig. 18. Figure 8 from Schluger’s article. Original caption reads: “Fig. 8. Illustrating a deep buccal pocket with a thick bony ledge on the buccal aspect with the gingiva proliferating above it. The dotted line represents the line of incision in both soft tissue and bone to reduce the pocket permanently. Note that no supporting bone is lost.”
Fig. 19. Postoperative results (2mm probing depth mesial #5 and distal #6) in a patient with recurrent periodontal abscesses treated by osseous resection. This patient was treated previously with a soft tissue gingivectomy which did not achieve the selected recession desired because of the precipitousness of the bone loss.

Fig. 20. Post Phase-I Therapy: Probing pattern revealed 5-7mm periodontal pocket depths interproximally between teeth #19-23. Probing depths on the lingual aspects of these teeth were only 2mm. Reduction in inflammation was noted after hase I therapy but pocket depths still persisted.

Fig. 21. Pre-Osseous Surgery: Following elevation of a full thickness flap and removal of granulation tissue, interproximal two-wall bone defects (craters) were revealed. Note loss of crestal cortical bone interproximally and consequent negative architecture (i.e., interproximal bone level more apical than lingual or facial bone levels).

Fig. 22. Post-Osseous Surgery: Therapeutic resection and re-shaping of crestal bone allows for re-establishment of positive (physiological) architecture; note sacrifice of lingual supporting bone. Positive architecture refers to the situation where crestal bone form mimics the contour of the cemento-enamel junction.

Fig. 23. One Year Post Osseous Surgery: Clinical periodontal health established on an anatomically reduced periodontium. Pocket elimination facilitates daily plaque removal efforts by the patient and also facilitates quarterly maintenance (supportive) therapy sessions.
by the hard tissues with which it is in contact. That is not to say that bone is such a rigid tissue that it will never round out its jagged edges or thin out its blunt margins. That is not the case. These changes are so slow, however, that the soft tissue overlying such bone will degenerate and become pathologic long before the changes can take place. It is for this reason that we must treat the problem clinically as if the bony form were permanent or nearly so. Herefore, we have contented ourselves with soft tissue surgery with minor or inconsequential attention to the bone limited to the reduction of spicules…

This does not mean that all periodontal surgery must include bone resection and reshaping as well. In fact, this is usually not the case. What is meant is that a considerable minority of cases require more than a simple gingivectomy—rather, a careful attention to the architecture of the supporting bone and the careful reshaping of that bone to conform to the rigid behavior of soft tissue. It is exactly the opposite conception from that now held in the field. We now accept the existing bone profile, hoping that the resected gingivae will conform, but experience has proved that they do not conform unless the bony profile is altered in the manner described in this report.

With the publication of Dr. Schluger’s article in 1949 (Figs. 14-18), the dental profession finally had a clear rationale and detailed technique that would allow clinicians to alter and reshape the crestal defects sustained from years of chronic inflammatory periodontal disease. In North America, Dr. Schluger was, without question, the most influential clinician to champion the new rationale for osseous surgery, and for many years shouldered the responsibility of answering his critics, some of whom were pugnacious in their disposition, regarding the wisdom and necessity of therapeutic sacrifice of supporting crestal bone. A controversy did ensue immediately following the publication of this article and continued for several decades thereafter; many clinicians continued to favor the gingivectomy procedure for pocket elimination, with its emphasis on biologic repair and natural bone remodeling. On the other hand, Dr. Schluger was very successful in convincing a small cadre of clinicians and students to apply his newly articulated principles of surgical pocket elimination (Figs. 19-23). Many of Dr. Schluger’s students went on to promulgate his ideas to a wider audience in American dentistry. These students proved to be very successful in explaining his surgical principles of osseous surgery with their dependence on the need for artificially creating “physiologic contours” by reshaping the bone, with chisels, files, and dental burs, in order to achieve a harmonious relationship between the altered bone topography and the overlying gingival tissues—a relationship perceived to be more conducive (perhaps even essential) to pocket elimination.

**Early Opposition to Osseous Surgery**

In 1953, with the publication of the textbook *Clinical Periodontology*, authored by Dr. Irving Glickman (Fig. 24) of Tufts College Dental School, the profession realized it had an articulate spokesperson, formally trained in medical histo-pathology, who challenged the wisdom of sacrificing bone by grinding the bone during periodontal surgery:

> It should be noted that the removal of alveolar bone is not indicated in the (surgical) treatment outlined above. The granulation tissue is carefully removed but the underlying bone is not disturbed. This surface is formed by trabeculae of microscopic proportions which constitute the scaffolding upon which bone is deposited in the course of healing. It is desirable for the retention of the teeth to have as much alveolar bone support as possible. All treatment procedures should be governed by this attitude.

There can be little doubt that Dr. Glickman, who completed dental school in 1938 and then entered a three-year pathology residency program at Tufts College Medical School, concurred with the views of Drs. Kronfeld and Orban regarding the non-necrotic status of alveolar bone tissue immediately adjacent to periodontal pockets. As a consequence, he endorsed, throughout his illustrious 32 year teaching career, the routine employment of the gingivectomy procedure for surgical removal of most periodontal pockets. With suprabony pockets he was routinely successful, and with shallow 2-wall and 3-wall intrabony defects he relied with confidence on the inherent biological remodeling potential of the healing bone tissue to result in a topography conducive to pocket elimination.
With all the techniques the infrabony pocket is first treated without artificially remodeling the bone, in an effort to obtain maximum healing... following treatment of infrabony pockets the tendency of the natural healing processes is to fill in the osseous defect and restore the physiologic bone contour, but the extent to which it occurs is not predictable.56

Dr. Glickman did recognize, however, when faced with localized deep infrabony periodontal pockets and bony defects, the value of flap entry to provide enhanced visualization for more thorough debridement and root planing of contaminated cemental surfaces, and more complete removal of granulation tissue.57

However, Dr. Glickman was not willing to sacrifice the vertical component “walls” of these defects, but rather allowed them to contain a more robust blood clot that frequently went through organizational and maturational phases to regenerate lost bone, cementum, and periodontal ligament, thereby adding healthy new support and strength to the previously compromised periodontium.

Dr. Glickman often referred to those practitioners of osseous surgery as displaying a “denture mentality:” a too-eager willingness to treat the living bone tissue of the alveolar process in a similar fashion to a laboratory technician, who cavalierly manipulates the inanimate plastic of denture bases and flanges, mechanically creating interdental grooves and sluiceways, while remaining oblivious to the deleterious histological and structural consequences of bone grinding.

Only with the sudden and premature death of Dr. Glickman in 1972 did the controversy slowly subside; osseous surgery employed to artificially re-create “physiologic contours” became commonplace in the late 1970’s without a vocal critic to dilute and challenge the arguments previously put forth in its favor.

Somewhat ironically, following the passing of Dr. Glickman, Dr. Irving B. Stern, a former student and teaching colleague of Dr. Schluger’s at the Columbia University dental school and the University of Washington dental school assumed the position of chairman of the Department of Periodontology at the Tufts University School of Dental Medicine in Boston. In September of 1975, for the first time at Tufts, not only was osseous surgery formally taught in a didactic seminar, but it was also emphasized in the surgical periodontal clinic—the same clinic and graduate program established by Dr. Glickman 30 years earlier.

The Influence of the Washington School

The crucial point of Dr. Schluger’s concept of “plastic repair” of the diseased altered periodontium was that while the bone was admittedly not necrotic (only inflamed), attention to and removal of only the inflamed overlying gingival tissues by gingivectomy would not bring about a lasting elimination of pockets. The idea that the underlying bone and the overlying gingival tissues should be and needed to be reasonably consistent with each in form, in order to eliminate pockets from an architectural perspective, must be considered Dr. Schluger’s quintessential insight into the field of surgical therapy.

The many specific details pertaining to the rationale for osseous surgery and its technique were described, in the dental literature, by the students of Dr. Schluger; the most ardent and vocal supporters were: Drs. Nathan Friedman (Fig. 25), Clifford Ochsenbein (Fig. 26), John Prichard (Fig. 27), Paul Heins, Jim Easely, Leonard Tibbets, Herb Selipsky, Bill Ammons (Fig. 28), Robert H. Johnson (Fig. 29), and Robert Lee Johnson. Fully cognizant of the potentially deleterious histological consequences of osseous surgery, Dr. Schluger nurtured the idea among his students that the “price to be paid” (i.e., the amount of supporting bone sacrificed necessary to achieve positive crestal architecture) was insignificant from the gross clinical point of view, and the achievement of a pocket-free periodontium and the subsequent potential benefits for the patient accrued from such was certainly worth this price.
In a chapter entitled “Resective Osseous Surgery” in the 2006 edition of the periodontal textbook *Clinical Periodontology*, the essential ideas promulgated by Dr. Schulger were summarized by Dr. Bill Ammons, professor emeritus at the University of Washington. Dr. Schulger had established the graduate program in Periodontics at the University of Washington in 1958; Dr. Ammons completed his training there in 1970. After completing his specialty program, he stayed in Seattle and immediately joined the faculty of the Department of Periodontology as a clinical instructor. While he had limited teaching experience, Dr. Ammons quickly became one of Dr. Schulger’s most trusted and resourceful teaching colleagues. As the years went by, he assumed more responsibility within the department; he was willing and able to provide the kind of mature leadership and loyalty to the graduate periodontal program that allowed it to remain, over three decades, an outstanding center of excellence in periodontal education.

Drs. Schulger and Ammons shared a common passion for the subject of periodontology and for the training of the future leaders in the field; this early professional bond led in time to an even more deeply-rooted and enduring bond of friendship and mutual respect. Dr. Ammons’ summary of Dr. Schulger’s ideas regarding osseous surgery include the following:

a. The goal of osseous resective therapy is to reshape the marginal bone to resemble that of the alveolar process undamaged by periodontal disease.

b. Knowledge of the morphology of the bony periodontium in a state of health is required to perform resective osseous surgery correctly.
c. The reshaping process is fundamentally an attempt to “gradualize” the bone sufficiently to allow soft tissue structures to follow the contour of the bone.

d. Terms that describe the bone form after reshaping can reflect the morphologic features (negative, positive, flat, and ideal architecture) or the thoroughness of the reshaping process itself (definitive or compromise osseous reshaping).

e. Common indications include: one wall angular defects, shallow 2-wall angular defects, shallow 2-wall interdental craters, and shallow 3-wall defects.

**The Influence of the Concept of Physiologic Gingival Contours**

Dr. Henry Goldman’s paper on the concept of physiologic contours, published in 1950, clearly abetted the spread and adoption of the osseous surgery technique and philosophy, because it strongly associated ideal physiological gingival form with health: Dr. Goldman maintained that normal or ideal gingival form had a self-cleansing ability which “…will aid materially in the maintenance of health.”

The achievement of these normal contours as a prerequisite for successful therapy was to have a profound affect on later writers dealing with osseous surgery. It allowed them to meticulously refine the technique of plastic repair, in essence by legitimizing and setting a goal for their mind’s eyes to duplicate. The contributions of the following clinicians were essential to the progressive refinement of the osseous surgery technique over the next 25 year period. For a list of these publications, see Appendix B, page 89.

**Challenge to the Osseous Surgery Concept of Plastic Repair**

In spite of the growing popularity of the concept of plastic repair among many periodontists, and the refinement of the osseous surgery technique by the late 1960’s, a forceful criticism of the unproven rationale and conceptual underpinnings for the employment of osseous surgery was, nevertheless, put forward in a paper authored by Dr. Jack Bloom in 1962:

The practice of altering bone dates at least as far back as Riggs, who removed necrotic bone and sharp spicules which, he thought, interfered with healing. In 1918 Zentler indicated that bone should be smooth so as to form an even surface with the root. In 1921, Nodine suggested that bone be removed in order to make the floor of the pocket smooth. In 1926 Zemsky added the word bevel to the description of bone…These, plus other references to the manipulation of bone, culminated in an article by Schulger in which the more common situations requiring removal of bone for successful treatment of periodontal disease are described. More recently, the concept of contour was extended to include bone, and operations are being performed on bone for prophylactic purposes. It is bothersome to find a prophylactic procedure advocated solely on the thesis that proper contour contributes to maintenance of health, when the concept of appropriate contour has not been established. The fact that the complications are not known but may be hypothesized as pernicious militates against unconsidered use of this technique.

One year later, another paper was published that seemed to consider the “unknown” complications alluded to by Dr. Bloom. This new publication, authored by Drs. Lobene and Glickman, attempted to demonstrate, at the histological level, the negative consequences of the osseous surgery technique. At the very heart of the criticism directed at Dr. Schulger’s concept of plastic repair, was the artificial nature of the mechanical intervention itself, the false sense of confidence in predicting the ultimate shape of the altered bone profile, and the arrogant disregard for the natural healing and remodeling potential of living bone tissue.

The findings indicate that grinding with a diamond stone is injurious to the alveolar bone because it causes necrosis, impairs healing and leads to a reduction in bone height. Doubt is cast upon the impression that bone contour can be predetermined by reshaping during periodontal treatment. The ultimate buccal contour is not formed by the reshaped bone. It is determined by new bone formed in an unsuccessful attempt to replace bone destroyed by the grinding.
**In Vitro Study**

The last major challenge to the osseous surgery procedure and the concept of plastic repair was put forth in 1976, in an article written by Drs. W. Ian Vogan and A.C. Knoell, entitled “The Biomechanical Effects of Simulated Osseous Surgery.”73

In this article, the authors, using dried jaw specimens and sensitive strain gauges, were able to measure and demonstrate a localized concentration of alveolar plate deformation in areas where simulated osteo-ectomy and osteo-plasty were performed. This finding appeared to refute the suggestion, made by Dr. Clifford Ochsenbein (a member of the Washington School) that osseous surgery in general was not injurious to the essential supporting function of the bony periodontium because it involved mostly osteo-plasty and only to a limited degree, osteo-ectomy. The terms “supporting bone” and “non-supporting bone” were first introduced in 1955 by Dr. Nathan Friedman in an article which advocated for the need for plastic repair; these terms were meant to mitigate the concerns and fears of those clinicians who envisioned excessive bone removal during the osseous surgery procedure. The artificial and arbitrary “division of labor” suggested by these terms was proven to be illusory in light of the findings of Drs. Vogan and Knoell: all the bone of the alveolar process was shown to transmit mechanical forces and thereby participate in the overall support of the teeth.74

The effect of mechanical stress on the remodeling of bone has been recognized since Wolff’s observations in the latter part of the 19th century. More recent investigations (Bassett and Becker, 1962; Cochran et al. 1976) have established that in bone, subjected to mechanical loading, those surfaces being compressed are associated with electronegativity and osteoblastic activity, while osteoclastic activity occurs at surfaces which are under tension and as a result exhibit electropositivity.

…it would seem likely that the removal of alveolar bone, whether clinically designated as osteoectomy or osteoplasty, would be followed by alterations in the stresses set up in the remaining bone…the results indicate that in dried mandibles, osseous surgery procedures resulted measureable increases in strain in the bone overlying those teeth involved with lesion and subsequent osseous surgery.

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**The Subjective Nature of Clinical Decision Making**

It is important to remember, in spite of the present and ubiquitous worldwide application of the osseous surgery approach for pocket elimination—that there has never been, nor will there ever be a histological or longitudinal clinical study that proves, beyond doubt, that osseous surgery always benefits the best interests of each patient who receives this form of therapy. As Drs. Jack Bloom in 1962 and Irving B. Stern in 1969 have succinctly and independently pointed out, only the subjective and compassionate judgment of the mature clinician can be trusted to serve, on an individual basis, the patients’ best interests.75,76

Dr. Bloom:75

In spite of the rather unsatisfactory state of knowledge concerning the benefits of surgical procedures, these procedures are unquestionably useful. The problem is not recognition of the utility of the various techniques but, rather, the development of attitudes toward their use which are consistent with the states of knowledge concerning them. In the final analysis, it is not the acquisition of information but the appropriate use of it in forming judgments which leads to the type of prudent action that distinguishes professional maturity.

Dr. Stern:76

…Loss of teeth with advancing age may be likened to the falling of leaves in autumn at the onset of winter and may be thought of by the patient as loss of virility and vitality—as the onset of death. The role of the dentist in dealing with tooth extraction calls for all the technical proficiency he can attain and beyond that, diagnostic acumen so that his technical proficiency is correctly exercised.

Superimposed upon these attributes is the ultimate one—that of ability to care for patients and render dental therapy with warmth, understanding, and empathy so that his patients truly are receiving health care. In this way, and in this way alone, can dentistry take the place among the healing arts.

There remains one additional and very important reason that scientific studies are not essential to confirm the legitimacy of this procedure. Osseous surgery truly represents a clinical challenge to the therapist: will further bone removal be advisable in the quest for pocket elimination, given the amount of anatomical root
structure and the degree of embarrassment to the integrity of the periodontal supporting tissues sustained after years of chronic periodontitis? In other words, is pocket elimination so essential to prevent further attachment loss in the future that it justifies the sacrifice and inducement of more attachment loss in the present? Would the patient be better off losing the bone slowly over many years, rather than in just a few minutes of high-speed drilling? The resolution of this predicament, with the patients’ best interests always kept in mind, is a clinical art form of a very subjective nature. Because it is an art form, the decision-making process does not require strict scientific validation. Dr. Daniel Heller, a well-known pediatrician from Brookline, Massachusetts, in his recent book, shared his insights on the subjective nature of patient care:77

I began a career as a doctor with a background in literature and art rather than science. That background has served me well as a clinician and a teacher. Fortunately for me, medicine turned out to be like literature and art. Medicine is based on current scientific knowledge, but it is not practiced as pure science. There is a well-accepted distinction in the medical community that is referred to as the “bench” versus the “bedside.” The “bench” doctors are the investigators who seek out the mechanisms of disease and try to determine the truth about biological and physiological processes. Science aims at the truth. It searches for the evidence that proves something conclusively. The bench is the laboratory work station where they do their work. They work very hard at all hours. Occasionally, they make a great discovery, but most of the time, they are searching for the truth.

The “bedside” doctors are physicians and nurse practitioners who try to take the knowledge from the bench and apply it to you as an individual. They see you in the office and take your calls in the middle of the night. They are there at the bedside when you are sick. They work very hard at all hours. Occasionally, they make a great diagnosis, but most of the time, they are just searching.

In art and literature, there is no truth. There is rarely one interpretation of the meaning of a book or a renaissance painting. Medicine from my perspective is a lot like art and literature. There are many interpretations of the signs and symptoms. One must hear the entire story and take in the full picture before coming to some conclusion. The conclusion is rarely the only conclusion possible. This the nature of art.

…Whatever the issue may be that we are dealing with at any given moment, very intelligent people can come to very opposite opinions. When it comes to dealing with individuals, we are dealing with medicine as an art and not a science. We apply scientific information from the bench, but it is not always applicable at the bedside. Each baby [patient] is an individual, and much of our knowledge is based on statistics for large groups. Not every individual will act according to our statistics.

Conclusion

The controversy regarding which surgical procedure, the gingivectomy or osseous surgery with the apically positioned flap, is best suited to achieving pocket elimination, is essentially over; most periodontists, since the 1980’s, have chosen to employ the osseous surgery approach. Two excellent review articles on the subject of osseous surgery attest to the enduring popularity and usefulness of this surgical procedure: in 1986, Dr. Clifford Ochsenbein published “A Primer For Osseous Surgery;” and in 1999, Drs. David F. Levine and Greg Filippelli published “A Review of Osseous Resective Surgery.”

The application of this particular surgical approach has, over the last 60 years, proven itself to be a safe and reliable procedure for the elimination of shallow to moderately deep periodontal pockets. However, because of its emphasis on the reshaping of the crestal periodontium, sacrificing healthy bone to achieve positive (physiological) architecture, its usage continues to present, even to the prudent and seasoned clinician, a challenging situation: when and under what circumstances do the benefits of this procedure outweigh the inherent risks of removing too much bone or not removing enough bone to achieve the desired result of pocket elimination?

Given the inherently subjective nature of clinical decision making, how can we as dental health providers, be sure, on a daily basis, that osseous surgery truly serves our patients’ best interests? The simple answer is: we cannot be sure.

Faced with this challenge, it behooves the prudent clinician to avoid the pitfalls of both the injudicious removal of bone support, and an overly capricious attitude about surgical case selection.
As previously noted by the renowned periodontal clinician and teacher, Dr. Gerald M. Kramer:

The selection of the surgical alternative in the treatment of the periodontal lesion imposes a special responsibility on the operator. The creation of a new wound in a human being in the attempt to abort a disease process, cannot and should not be taken lightly. The drama, the vicarious thrill of a well executed surgical procedure with its rewards of ego satisfaction, patient admiration, respect and financial gain all too often may tip the balance of the scales in weighing the treatment prerogatives.

In order to temper the enthusiasm of his young “bone assassins,” Dr. Schluger (Fig. 30) frequently cautioned that osseous surgery was not for everybody. While further specific advice was not forthcoming, Dr. Schluger let it be known that other factors needed to be weighed, other than the mere presence of interdental craters or other vertical bone defects considered amenable to his osseous surgery technique. In addition, Dr. Schluger frequently gave voice to the idea that bone re-shaping by itself did not really mean that the clinician was treating periodontal disease. There was no disease per se, only non-specific inflammation of the periodontal tissues that lead to morphological alterations. Osseous surgery addressed these morphological changes—but the inflammatory process itself was never altered.

While it may be a popular idea that “scientific evidence” should inform the dental surgeon, it is equally true that this evidence should not dictate all clinical decisions. There is no substitute for clinical experience, and it must be earned, over time and in the face of many challenges, in a careful and compassionate manner. Prudent clinical judgment regarding the necessity and execution of surgical intervention is the ultimate goal; the American public and those of its members who eventually need to depend on us deserve nothing less.

Dr. Schluger readily acknowledged that there was a maturation process which each of his post graduate residents needed to endure before they reached their full potential and the coveted goal of being a prudent surgeon. The following quotation by an anonymous Persian author adorned the wall behind Dr. Schluger’s desk, a “secret gift” boldly on display for those fortunate few who found themselves standing before him, whether in awe or admiration, to see:

“There are those who don’t know, There are those who don’t know they don’t know, There are those who know they don’t know, There are those who know.”

Postscript: Clinical Case Study

The images on the following pages (Figs. 31-47) document a typical quadrant of osseous resective therapy employing Dr. Schluger’s principles of plastic repair; the overall goal of the surgical intervention was periodontal pocket elimination. The patient was a 53-year-old man with a past medical history of arthritis, and a chief dental complaint of periodic gingival soreness and bleeding. Clinical findings included evidence of bruxism, interproximal periodontal pockets, bleeding upon probing and slight tooth mobility. The original diagnosis was generalized moderately severe chronic marginal periodontitis. The post-treatment diagnosis at six months was generalized clinical health on an anatomically reduced periodontium.
Fig. 31. Pre-treatment radiograph of teeth #30-28 demonstrates generalized horizontal crestal bone loss with a localized angular defect on the mesial of #29. Central radio-opaque zone represents the beam attenuation ability of the mandibular lingual tori.

Fig. 32. Pre-treatment radiograph of teeth #28-25 demonstrates loss of crestal lamina dura shadow between #27 and 26 along with generalized horizontal crestal bone loss. Continuity of apical lamina dura shadows and periodontal ligament space shadows suggest normalacy of the apical periodontium.

Fig. 33. Initial Examination: Note generalized attrition of the occlusal and incisal surfaces. Generalized scalloped gingival form and adequate zones of keratinized attached gingiva. Periodontal pockets (5-8mm in depth) present between teeth #30/29, 29/28, and 27/26. Localized loss of papillary height between teeth #29/28. Tooth #28 in prominent buccal position.
Fig. 34. Six weeks after completion of Phase I therapy, bleeding and pocket depth have been reduced. Localized 4-6mm periodontal pockets still remain between teeth #30/29, 29/28, and 27/26 in spite of improved patient home care measures.

Fig. 35. Pre-Osseous Surgery: Elevation of full thickness flap revealed irregular crestal bone form (negative architecture) between teeth #30/29, 29/28 and 27/26. Note positive (physiologic) crestal bone form between #28/27.

Fig. 36. Exploration of crestal bone profile with a periodontal probe identified a 3-wall defect on the mesial aspect of #29 and 2-wall defects (craters) between #30/29 and 27/26.

Fig. 37. Reshaping of irregular crestal bone margin results in positive (physiologic) architectural form, but at a significantly more apical position on the root surface; compare to image of brown Peruvian skull specimen (Fig 38).
Fig. 38. 1200-year-old Peruvian skull demonstrates positive (physiologic) architectural form of the crestal bone margin; i.e. crestal bone form mimicking the contour of the cemento-enamel junction (CEJ) at a level 1.5mm apical to the CEJ.

Fig. 39. Six Months Post-Osseous Surgery. Clinical periodontal health re-established. There are generalized 1-2mm probing depths; color, size, shape, consistency are within normal limits. Bleeding not present with gentle probing technique.

Fig. 40. Six Months Post-Osseous Surgery. Patient’s dedication to improved personal home care measures ensures the following: a) maintenance of health of the new dento-gingival junctional anatomy; b) reduced risk of root caries.

Clinical Case Study: Lingual View

Fig 41. Initial Examination: Generalized scalloped appearance of the gingival margin with deep 5-7mm periodontal pockets between #30/29, 29/28, and 27/26. Note adequate zone of keratinized attached gingiva and increased width of the alveolar process due to presence of the lingual tori.
Fig. 44. Pre-Osseous Surgery: Following removal of granulation tissue from the crestal bone defects, exploration of the crestal bone profile with a periodontal probe revealed the following: 3-wall defect mesial #29 and 2-wall defects (craters) between #30/29 and 27/26.

Fig. 45. Positive (physiologic) crestal bone architecture achieved between #30/29, 29/28, and 27/26. Therapeutic sacrifice of lingual tori was necessary to facilitate achievement of positive architectural form. Note reduced width of alveolar process.

Fig. 42. Six Weeks After Completion of Phase I Therapy: Bleeding and pocket depth have been reduced. Periodontal pocket depths (4-6mm) remain between #30/29, 29/28, and 27/26; bleeding persists in these areas upon gentle probing.

Fig. 43. Elevation of full thickness flap revealed lingual tori with lobulated form. Note positive (physiologic) architecture between #28/27 and negative architecture between #30/29, 29/28, and 27/26; negative architecture is associated with the loss interproximally of the crestal cortical bone; the interproximal bone profile no longer mimicks the contour of the cemento-enamel junction.
Authors’ Acknowledgements

The authors would like to express their sincere gratitude to the following individuals who after graciously agreeing to review the manuscript for this article, provided valuable suggestions and insightful criticisms: Drs. Gerry Grasso and Walter H. Meinzer, both senior faculty members in the Department of Periodontology, Tufts University School of Dental Medicine; Dr. Charles B. Millstein, historian of the Massachusetts Dental Society and senior faculty member, Department of Endodontics, Tufts University School of Dental Medicine; and Drs. Michail Koulianos, (2nd-year perio resident) and Evangelos Papathanasiou (3rd-year perio resident) at Tufts University School of Dental Medicine.

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Fig. 46. Bleeding controlled by continuous sling silk suture; apical positioning of flap margin to new crestal bone level achieved. Note marginal tear of the flap margin at the disto-lingual aspect of #27.

Fig. 47. Periodontal health re-established (generalized 1-2mms probing depths with no bleeding upon gentle probing) but at a more apical position on the root surface. Patient assigned to recall (supportive therapy) program.


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### Appendix A: Key Publications by the Vienna School


Appendix B: Key Publications That Supported the Washington School


Historically there was an attempt by many dental practitioners to implicate anesthetic solutions in the death of the dental pulp. However, their implications may or may not have been valid, as damage to the dental pulp may have resulted from excessive and deleterious restorative procedures on teeth that were anesthetized. Unfortunately little was known about the anesthetic solutions at that time, their composition, which included vasoconstrictors, and their potential to alter pulpal blood flow. This paper will explore both the historical perspectives and concerns regarding the impact of anesthetic solutions on the dental pulp through the eyes of Dr. C. Edmund Kells, along with the contemporary perspectives and realities through the eyes of science, sound research data and clinical practice.

The introduction of local anesthetics in dentistry was a major breakthrough in pain management for both the clinician and the patient. As an anesthetic, cocaine was used to numb the tongue and gingiva by Professor C. D. Schroff in 1862.\(^1,2\) Subsequently, cocaine was identified as being the original local anesthetic with unique properties. These were demonstrated by Carl Koller (a classmate of Sigmund Freud), from Vienna in 1884,\(^3\) when he used a 2% solution of cocaine to anesthetize first the eye of a frog, then a rabbit, a dog and subsequently himself. In 1892 he detailed the use of cocaine for anesthesia in eye surgeries.\(^4\) However, due to the slow absorption of the cocaine solution into the interior the eye from the conjunctival sac, the anesthetic preparation of the patient had to be performed long before the surgical procedure.

The use of a cocaine solution for mandibular anesthesia was first demonstrated by William Stewart Halsted, a Professor of Surgery at the Johns Hopkins University, shortly thereafter (somewhere between November 26\(^{th}\) and December 1\(^{st}\) 1884).\(^5\) Approximately nine minimis (1 US minim is equivalent to 1/480 of a fluid ounce) of a 4% solution of cocaine was used to produce complete anesthesia in approximately 4-6 minutes. This injection was a pure experiment and was not put to practical use. Later in 1884, the mandibular block that was made for practical...
“I have heard it stated, more than once, that the injection of novocain for the painless preparation of a cavity frequently causes the death of the pulp of the tooth operated upon.” He proceeded to cite an example along with an attempt to logically work through the problem at hand and arrive at a reasonable explanation.\(^{12}\)

Only the other day a man, of whom I’d have expected better, told me that he found ‘trouble’ often followed the use of novocain for cavity preparation. Now just let’s stop for a moment and analyse the situation, and look at it from a common sense standpoint. Let us assume a case: Our friend blocks the inferior dental nerve and then goes ahead and painlessly prepares a complex cavity in a lower bicuspid. The patient thinks it’s great. Painless dentistry. What a wonder modern dentistry is!

The inlay is set. A few days later the patient returns complaining of pain at times. Then another day or two and the pain is constant. Then the inlay is removed and possibly the damage has been done – a root-canal to be filled.

The death of the pulp is attributed to the use of novocain. What a joke! If the novocain would cause the inflammation and death of the tooth operated upon, would it not cause the same trouble with the molars and other bicuspid that were not operated upon?

With all the teeth upon that side of the jaw desensitized, why would the novocain have the ‘selecting’ faculty of picking out the only tooth operated upon and setting up a disturbance therein? That’s where the joke comes in. As all the pulps are affected equally by their novocain, why don’t they all give trouble?

Once Kells has worked through the problem at hand he offered an explanation as to what or who the real culprit may be:\(^{12}\)

Now what undoubtedly does happen is this: The cavity being desensitized, the operator goes on cutting and shaping to suit his own ‘sweet will,’ which sweet will is not backed up by good judgment. The result is he bares the normally sensitive dentin to such an extent that, when it recovers its ‘normalcy,’ it can’t stand the strain; the inlay is too close, thermal shock ensures and that’s all there is to that.

While I must plead guilty of a lot of rotten work, I thank my stars that to remove a newly placed metallic filling is one the faults I practically never am called upon to do, and only for the reason that I positively will not put a metallic filling in any cavity prepared under novocain, That’s final!

The first modern local anesthetic agent was lidocaine, which was synthesized by Löfgren in the 1943.\(^{8}\) The major problem with lidocaine and its analogs was that they caused vasodilation, or the tendency of the local blood vessels to open wider increasing the blood flow in the area. This caused the anesthetic to be absorbed too quickly to take effect; the phenomenon identified by Braun almost 40 years earlier that prompted him to use the anesthetic solution with a vasoconstrictor. Hence these new anesthetics were always mixed with low concentrations of epinephrine to achieve the opposite effect (i.e. vasoconstriction), by closing the blood vessels down to keep the anesthetic in position long enough to produce long lasting anesthesia. This use of anesthetics combined with vasoconstrictors has been identified both historically and contemporarily as being a potential cause of pulpal demise.

**Historical Concerns**

Hellner, in 1927, expressed concern over the potential for a marked reduction in blood flow resulting from the local dental anesthetics.\(^{11}\) This concern may have coincided with those that C. Edmund Kells identified around that same time.\(^{12}\)
As with many things with Kells, he not only had to have the last word on the issue, but in his enthusiasm to make a point, he would usually make effort to ensure that his reader did not miss the point.12

Another argument that should be absolutely convincing. If the nerve blocking causes the death of the pulp, how is it that thousands of people have the nerve blocked for the purpose of extraction, and no pulps in the teeth that are allowed to stand in the anesthetized region die?

No, friends, whenever you have trouble with your painless dentistry, do not charge it to the ‘local.’ Just ‘acknowledge the corn’ and charge it to your own bad judgment and want of skill, and let it go at that.

Of course, while Kells had legitimate arguments against the impact of the local anesthetic on the dental pulp, he did not have a full understanding of the problems that may occur with local anesthetics, altered pulpal blood flow, the presence of an already-compromised dental pulp and the potential damage that could occur under a unique set of clinical and biological circumstances. However, he did rightly identify the lack of understanding on the part of his colleagues and their attempt to “pass the buck,” so to speak, when it came time to recognize what or who was at fault in these circumstances. Modern science would ultimately shed a great deal of light on this potential problem.

Contemporary Concerns

Olgart and Gazelius reported in 1977 that supraperiosteal injections of lidocaine with epinephrine in the apical area of the tooth resulted in almost complete cessation of the blood flow to the pulp.13 Further support for this concept was provided by Kim and co-authors in 198414 and again in 1992.15 In particular in the latter study, these investigators noted that the use of epinephrine-containing anesthetics resulted in a severe reduction in pulpal blood flow, whether caused by infiltration or mandibular block anesthesia. When applied to a commonly-used restorative procedure, such a crown preparation, that causes a reduction in vascular reactivity (which is a sign of the initiation of the inflammatory process), an added reduction in pulpal blood flow caused by epinephrine-containing anesthetics are probably detrimental to the pulp. Ahn & Pogrel also stressed the same concern about dental pulps “that are already compromised” when they noted a significant reduction in pulpal blood flow with injections of 2% lidocaine with 1:100,000 concentration of epinephrine.16

Unknown at the time of Kells was the use of ligamentary injections17,19 and intraosseous injections,20 which are quite common in today’s attempts to anesthetize mandibular molar teeth with acute irreversible pulpitis. While these injections are appropriate for procedures that result in pulp extirpation, these types of injections would be inappropriate for teeth that have vital pulps15,21 unless the root apex exhibited a large apical foramen vis à vis a generous blood supply.22 Likewise, in the case of the intraligamentary injection, bone and tooth resorption have subsequently been noted, which may create a greater degree of inflammation in the supporting tissues with an ultimate impact on the dental pulp.23 Somewhere within these parameters of consideration (the tooth with the irreversible pulpitis and one that has had no clinical challenges and has an open apical foramen), lies the tooth with a narrowed root canal and apical foramen, previous multiple or large restorations and reduced pulp chamber that responds to pulp sensibility testing. However, in actuality the pulp is in a compromised state due to the presence of long-term irritants such as leaking restorative margins, recurrent caries, or periodontal disease and exhibits calcifications, exposed cervical dentinal tubules or evidence of chronic tissue degeneration with the presence of chronic focal sclerosing osteitis.24,25 In these cases, is it possible for the anesthetic with a vasoconstrictor to affect the ultimate vitality of the pulp, and subsequently to even a simple restorative procedure? Might the patient experience pain or distress that is sufficiently significant to warrant pulp extirpation? Under these circumstances and if vasoconstrictor-containing anesthetics were used, especially with one of the more contemporary anesthetic delivery techniques that could constrict the pulpal vasculature, would Kells’ concerns, arguments, explanations and admonishments still be appropriate?
References


The History of Dental Hygiene in South Korea

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This historical narrative highlights the origin and development of the dental hygiene profession in South Korea. The legacy of early American missionaries to Korea includes profound and long-lasting contributions in medicine, education and theology. Many of Korea’s top universities today have their roots in the missionary schools of the late nineteenth century, including Yonsei University, home of the first dental hygiene program in Korea. From Yonsei in Seoul, the dental hygiene profession spread throughout the country, including the American missionary-based program in Kwangju in 1977. Contributions included clinical and didactic education, as well as professional leadership and development. American dental missionaries developed the profession of dental hygiene in Korea, and provided guidance to Korean dentists and hygienists for its growth and expansion.
Introduction

American missionaries had a profound impact on Korean society, having created a legacy in the importation of Christianity, Western education, and medicine, including dentistry. Contributions included clinical and didactic education, as well as professional leadership and development. American dental missionaries developed the profession of dental hygiene in Korea and provided guidance to Korean dentists and hygienists for its growth and expansion. Due to the vision of the early missionaries, dental hygiene is very much a part of the legacy that began in Korea 44 years ago.

Medicine and Higher Education Introduced

In 1884, the arrival of two individuals would significantly alter the course of oral hygiene in the country. The first was Dr. Horace N. Allen (Fig. 1), who went to Korea as the nation’s first Presbyterian medical missionary. He introduced many Western medical techniques which were previously unknown to the people there. Within a year, Dr. Allen initiated the first training program at the Severance Union Medical College and Hospital, and accepted 16 students who would become Korea’s first modern medical doctors.1 The second individual, Dr. Horace G. Underwood (Fig. 2), a Presbyterian pastor & educator, arrived and eventually founded the Yonhee College, Korea’s first modern college.2 This marked the beginning of expansive educational, religious and social developments in Korea.

Modern Dentistry Introduced

Modern dentistry was first introduced to Korea in 1915 by Dr. W. J. Scheifley, who established the Department of Dentistry at the Severance Union Medical College in Seoul. Taking his mission very seriously, Scheifley stated:3

It is with a feeling of tremendous responsibility that I am undertaking to connect dentistry directly with the missionary movement. As far as I can discover, it is the first time this had been tried. The results of our efforts not only depends the future of this work in Korea but some influence will be borne upon the undertaking of this work in other places. At the best our efforts are an experiment.

In 1920, Scheifley left Seoul after his first term as a dental missionary, but his work proved to be successful and had lasting impact.

Dr. J. L. Boots and Dr. J. A. McAnlis, both Presbyterian missionary dentists, arrived separately in the port city of Incheon in 1921, but both worked in Seoul.4 Dr. Boots focused on training and delivering dental care to Koreans at Severance, while Dr. McAnlis provided dentistry to missionaries and other foreigners residing in the country. Dr. Boots’ dream was to build a separate building for the dental department. After five years of fund-raising in the United States, the first modern dental health center in Korea was built next to Severance Hospital in October 1931. Dr. Boots left Korea in 1939; however, Dr. McAnlis stayed on as the director until 1940.5

From 1940-1957, most American missionaries left Korea to escape the persecution of Christians during WWII and the Korean War, although medical work continued under Japanese rule.6 Furthermore, at the end of World War II, Korea was divided at the 38th parallel into North Korean and South Korean zones of occupation. In 1948, rival governments were established, with the People’s Democratic Republic of Korea in the North and the Republic of Korea in the South. The Korean War took place from 1950 until a cease fire
was declared in 1953. The discussion that follows refers only to South Korea, or the Republic of Korea (ROK), due to its democracy and openness to US influence.

In 1957, Yonhee University and Severance Union Medical College merged, taking the first syllable from each of the two schools’ names to become Yonsei University. The Department of Dentistry at Severance Union Medical College was moved to Yonsei University Campus in 1962, and accredited by the Ministry of Education in December 1967. The next spring, 40 students registered in the first formal accredited pre-dental course in the College of Dentistry at Yonsei.7

Dental Hygiene Begins in Korea

American missionaries eventually returned to Korea after the Korean War ended in 1953. Meanwhile in the US, the Christian Dental Society (CDS) was founded at the 1962 American Dental Association Convention in Miami, where Dr. John McInnes from Tucson, Arizona, was elected as the first chairman. The vision of the CDS was to address the dental needs of church-related hospitals and clinics all over the world.8 In 1962-1963, Dr. McInnes and Dr. Roy D. Ribble, CDS missionary dentists, recommended the creation of a program in dental hygiene at Yonsei University. The program was formally proposed to the government in 1964 and opened in 1965 under the direction of Korean dentist Dr. Jhee Heun-Taik.3 Dr. Jhee traveled to the University of Michigan to observe the dental hygiene program and study their curriculum so that ideas could be adapted for the Korean program.

In 1967, dental hygiene was officially established in Korea, with the graduation of the first four dental hygienists from Yonsei University. (Fig. 3) The early years of dental hygiene in Korea lacked educational standards and professional guidelines. Within seven years, the Ministry of Health and Welfare established educational standards and instituted the National Board Examination in 1974.9

The second dental hygiene program in Seoul opened in 1977. It was a two-year program associated with Kyung Hee University.10 During that time, the government expanded medical insurance to include dental coverage, with dental hygienists to be employed in all local health departments. This was an incentive to open new programs in junior and technical colleges as many more dental hygienists were needed.

Dental Hygiene Program Expands Beyond Seoul

The first dental hygiene program to open in the ROK outside of Seoul was at Seowon Junior College in Kwangju, in the southwestern province of Chulla Namdo. This work was started in 1977 by American Presbyterian missionaries Dr. Dick H. Nieusma, DDS, and Nancy L. Kane, RDH. (Fig. 4) They were assisted by Ms. Oh Jung-Sook, RDH, graduate of the Yonsei program in Seoul. (Fig. 5) Dr. Nieusma from Holland, Michigan, was a career missionary dentist at Kwangju Christian Hospital.11 Ms. Kane was a two-year volunteer dental hygienist from Gate City, Virginia, initially sent to work at the hospital dental clinic with Dr. Nieusma. She was the first dental hygienist in Chulla Namdo.12 Both Ms. Kane and Dr. Nieusma agreed to assist Seowon Junior College in establishing the associate’s degree program. The first class at Seowon graduated in 1979. (Fig. 6)
Interestingly, three male graduates were denied permission to take the licensing examination due to gender, so they became dental laboratory technician apprentices. Later, the government relented and now allows men to serve as dental hygienists. On September 5, 2004, Kim Tae-han was elected the first president of the Korean Male Dental Hygienists' Society.

In 1979, all junior colleges were reorganized by the Korean government into technical colleges. By 1981, all two-year programs were expanded into three-year programs when prerequisite courses were established. Shortly after, the fourth dental hygiene program began at Dankook University in Seoul in 1987. By the early 1990s many new programs opened throughout the country. Faculty were recruited the programs that had opened in the 1960s and 70s, and the profession grew quickly. The dental hygiene curriculum included liberal arts and sciences, oral anatomy, public and oral health, preventive dentistry, clinical practice, nutrition, dental materials and radiology.

The Korean Dental Hygienists’ Association

The first organizational meeting of the KDHA was held in Seoul in 1977. Nancy Kane and Oh Jung-Sook from Kwangju attended the meeting. Ms. Kim Sook- Hyang, a graduate of Yonsei Dental Hygiene Program, was elected the first President. She received her Bachelor's Degree in Dental Hygiene Education from Loyola University in Chicago in 1975, and returned to Seoul as a leader in the profession and as an educator. The KDHA grew quickly with its mission of advancing the art and science of dental hygiene by ensuring access to quality oral health care. The organization has created several publications, including the peer-reviewed Journal of the Korean Dental Hygienists’ Association.

Definition of Duties and Licensing

Patterned after dental hygiene in the United States, dental hygiene in the ROK began as an auxiliary career under the supervision of a licensed dentist. Duties include scaling, polishing, oral health education and promotion, fluoride, sealants and radiographs. Licensing requirements include graduation from an accredited program with successful completion of a written and clinical board exam. The written board consists of 200
questions in various subject areas, while the clinical exam is a simulated scaling exercise on a manikin.9

Korean dental hygienists practice in private dental offices, community centers, schools, public health centers, corporations, orthodontic clinician programs and as dental assistants. Korean dental hygienists are also trained in office management strategies and serve in front desk capacities.

Growth & Current Status

In 2002, a few Korean universities began offering bachelor’s degrees in dental hygiene. The first four-year program for dental hygiene in Korea was started at Yonsei University, Wonju Campus, in 2002.14 Popular majors for dental hygiene students pursuing a master’s or doctoral degree include education, public health administration, public health management and environmental science. It is now a requirement for dental hygiene educators to have a doctoral degree.

60 years since the Korean War, the explosive expansion of Korean education at all levels has produced drastic changes in both the quantity and the quality of education provided. Currently, South Korea has more than 22,000 registered dental hygienists (RDH) for a population of slightly over 48 million.15 South Korea has 52 three-year diploma dental hygiene programs based on a rigorous core curriculum. There are also 11 four-year degree programs nationwide, totaling 63 dental hygiene programs. The South Korean education system encourages a strong culture of research and innovation among its graduate dental hygienists. Goals for the undergraduate programs include: standardizing curriculum for the three-year programs, implementing new accreditation guidelines and regular site visits.16

The Korean Dental Hygienists’ Association is a member of the International Federation of Dental Hygiene (IFDH).15 The first International Symposium on Dental Hygiene was planned by the American Dental Hygienists’ Association and was held in Italy in 1970.17 The KDHA joined the IFDH in 1992.13 Every three years, the IFDH holds its worldwide conference; the president and vice president of the KDHA represent Korea. In 2010,
the KDHA had more than 22 delegates, including the current President, Kim Won-Sook, RDH, representing the ROK in Glasgow, Scotland. (Fig. 8)

Conclusion

2011 marks the 44th anniversary of the profession of dental hygiene in Korea. The legacy of early American missionaries to Korea includes profound and long-lasting contributions in medicine, education and theology. Many of Korea’s top universities today have their roots in the missionary schools of the late nineteenth century, including Yonsei University, home of the first dental hygiene program in Korea. From Yonsei in Seoul, the dental hygiene profession spread throughout the country including the American missionary-based program in Kwangju in 1977. Graduates and faculty from that program went on to eventually form the Dental Service International Corp (DSI). In the 21st century, the work of Protestant missionaries continues as Korean dental mission organizations such as DSI have opened dental clinics, dental schools and dental hygiene programs in other parts of the world. Examples include: the All Nations Dental Center in Tashkent, Uzbekistan (Fig. 9); the Meerim Dental Clinic in Bishkek, Kyrgyzstan; and the Charity Dental Clinic in Ulanbataar, Mongolia.18,19

The cycle of education, ministry and healthcare continues. Thanks to the vision of the early missionaries, dental hygiene is very much a part of the legacy that began 44 years ago in Korea: a profession which continues to grow and evolve.
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2. Ibid.


4. Ibid.

5. McAlpine JA. Papers, Box 322, Folder __: item description, PCA Historical Center, St. Louis, MO. (Presbyterian Survey) 1928. (1), (2)


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Book Review

David A. Chernin, DMD, MLS

Der Zahnstocher und Seine Geschichte eine kulturgeschichtlich-kunstgerbliche studie (The Toothpick and its History: A cultural-historical and arts and crafts study) has long been on my wish-list for translation.

There have been a number of English language articles about the toothpick, J. Menzies Campbell’s 1952 paper (Campbell JM. Toothpicks and toothbrushes. Dent Items of Interest. 1952;74: 295-305.) is of particular note. Since then, our Bulletin and Journal have published numerous articles on this subject providing additional information and literature citations.

However, Dr. Sachs’ monograph remains the premier reference resource. We must congratulate Dr. Potashnick for the time, effort and cost in providing this English translation. The only “pick” I have with this reproduction is the omission of the two original title-pages, which are reproduced on the opposite page.

For readers who wish to learn more about Dr. Sachs, see the following article from our publication: Gold SI. Hans Sachs: Pioneer Periodontologist and Dental Historian. Bull Hist Dent. 1986; 34(1): 28-33.


The Toothpick and its History

by Dr. Hans Sachs
Translated by Anna C. Souchuk, PhD
Published by Steven Potashnick, DDS
Soft cover, 51 pages, 86 illustrations

Ordering Information:
Dr. Steven Potashnick
528-A West Barry Avenue
Chicago, IL 60657-5417
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Price: $35.00
Postage: $5 US, $14 Europe

ISBN 978-1456494179
Bremner Award for Pre-Doctoral Dental Students

A certificate, $500 cash prize and up to $500 travel and related expenses will be awarded to the winning unpublished essay on:

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2) The result of an original research effort related to dental history
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Entries must be original essays, not more than 5,000 words, on a subject relevant to dental history.

Selection: A special committee of the Academy will judge all entries received prior to May 1, 2012, for the current year’s award. The winner will be announced prior to July 1, 2012, so that said winner may be in attendance at the annual meeting of the Academy.

Application: Send typed essays (in triplicate), following the Instructions for Authors for the Journal of the History of Dentistry, along with a statement of authenticity by the Dean or responsible faculty, by May 1, 2012.

The Award is presented at the annual meeting of the American Academy of the History of Dentistry.

Please submit papers prior to May 1, 2012.

Please direct correspondence to:
Dr. Arden G. Christen
7112 Sylvan Ridge Road
Indianapolis, IN 46240

Journal of the History of Dentistry/Vol. 59, No. 2 Summer/Fall 2011

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This un-mailed U.S. commercial postcard was purchased at the Smithsonian Institution gift shop in the early 1990s. Printed in Singapore in 1989, it belongs to the Warshaw Collection of Business Americana, Archives Center, National Museum of American History, at the Smithsonian Institution in Washington, DC. It was reproduced from a 1911 painting by 75-year-old Karl Reichert, a prolific creator of genre works, town scenes, and small-scale, highly detailed portraits of dogs and cats. Karl, the son of the celebrated animal portrait painter Heinrich Reichert, was born in Vienna, Austria in 1836. Through the influence of his father, he was able to study under a number of master painters in Munich, Rome, Vienna and his hometown of Graz, Austria. He died in his hometown in 1918, at age 82.

This masterful animal portrait depicts the woeful state of a toothache-suffering dachshund. Note that he wears the universally recognized toothache garb: a bandana tied neatly from his chin to the crown of his head. Although it looks as if he is smoking a cigarette, a closer examination reveals that this object firmly gripped between his jaws is a white glass medical thermometer. The patient is lying on a sofa, with his head and shoulders resting on a pillow and his lower extremities covered with a blanket.

Wearing pince-nez glasses, he holds Issue #1 of the Convalescent newspaper. However, he is not reading it. Instead, with his mournful, brown eyes, he stares into space above the paper’s back page, which is upside-down! Apparently, he is too lethargic to be interested in any recovery news.

Dental postcards with images of bespectacled dogs (and other animals) having toothaches and wearing the pain assuaging toothache bandana are not uncommon. Swanson and Hamann’s fascinating 2005 dental postcard book, Hog Bristles, Hucksters & Radioactive Paste, identifies a number of animals in similar situations. Throughout the years, other images, and even miniature statuettes of such dentally-afflicted dachshunds have been crafted. Today, many can be found for sale on eBay and other commercial sources.
Dental Postcards XLVII

Collected and analyzed by
Arden G. Christen, DDS, MSD, MA
Joan A. Christen, BGS, MS
Indiana University School of Dentistry

Color postcard. 10 x 13.8cm

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Electric & “Eclectric”

N.K. Fowler, Mrs. Geo. W. Shattuck, and Geo. O. Wilson sing the praises of C.E. Carter’s ELECTRIC NERVE PENCIL on the back side of these attractive trade cards. This “Great Japanese Remedy” “absolutely Annihilates the Severest Forms of HEADACHE, NEURALGIA, TOOTHACHE, RHEUMATISM, and Every Kind of NERVE PAIN in a Few Minutes.” Geo. O. Wilson proclaimed, “I pronounce it the best thing out” and he “would not take five dollars for mine if I could not get another.” The cards give no hint about how the product was to be used. We do not know if this product actually used electrical current, perhaps in a similar manner to today’s transdermal electrical nerve stimulation (TENS).

Like “magnetic,” the word “electric” had magical marketing powers in the Victorian Era. (“Laser” and “nano” have similar marketing charisma in modern times, and magnetic health products also persist.) If a product claimed electric properties, it was considered novel, noteworthy, and special. Victorian cards for “Dobbin’s Electric Soap,” “Electric Lustre Starch,” “Electric Light Illuminating Oil” and “XXX Electric Soap” and others, are commonly seen.

Capitalizing on this trend, Dr. S. N. Thomas marketed “Dr. Thomas’s Eclectric Oil,” starting in the 1840s. Claims for the Eclectric Oil included cures for many disease conditions, including a toothache cure in five minutes. “Eclectric” looked so much like “Electric” that the deception was ideal
for the manufacturer, who published dozens of different colorful trade cards touting the product. According to Oleson’s Secret Nostrum and Systems of Medicine: A Book of Formulas, Dr. Thomas’s Oil contained: “gum camphor, oil gaultheria, oil origanum, chloroform, tinct. opium, oil sassafras, oil hemlock, oil turpentine, balsam fir, tinct. guaiacum, tinct. catechu, alcohol, alkanet.”

As far as we know, no one has ever offered a definition of “Eclectic.”
THE BREMNER AWARD AGREEMENT

P/ All rights and royalties from M. D. K. Bremner's Story of Dentistry, 3rd edition, have been legally transferred to the A.A.H.D. as a gift from the author. The proceeds of sales from this historical work, according to the terms of the agreement, are for the purpose of an annual award of $100 to the undergraduate student who, in the opinion of the judges, submits the best historical essay of from 2,000 to 2,500 words on a dental subject. Essays must be submitted before June 1 to compete for the award. The prize winning essay may be read at the annual meeting of the Academy, and the author will become an active member of the Academy for three years without dues. Every essay submitted becomes the property of the Academy, and if published, the author will receive an honorarium of $25. Annual announcement of the competition will be made in every accredited dental school of the United States and Canada.

MEETING OF THE A.D.A. IN 1866

P/ A rare photograph of the members of the American Dental Association attending the sixth annual session at Boston, in 1866, has been furnished by Dr. B. W. Weinberger for the history of the A.D.A. in preparation. The photograph which is only about 4 inches by 5 inches in size is mounted on an eigh by ten sheet of paper with the names of the persons (and identifying numbers) printed in the margins. When the photograph is enlarged about two diameters the likenesses are fairly clear and the persons portrayed are recognizable. Over one hundred persons are represented. The circumstances of the taking of this picture August 1, the second day of the meeting, are given in the Dental Cosmos (8:73 Aug. 1866) as follows: "At two o'clock the Association adjourned to meet at half-past seven. The members, under the direction of the Committee of Arrangements, were then massed upon the steps of the State House, where several photographs of the body were taken by A. Whipple, Esq., of Boston." The source of this mounted photograph, which appears to be removed from a book or pamphlet, is unknown. Dr. Weinberger believes that the page was part of a collection which had belonged to James McManus, well-known student of dental history.

Dr. Hans Christian Greve, distinguished German historian of dentistry, died April 13, 1955, at the age of 85. He was professor of dentistry at the University of Erlangen, Bavaria, and had contributed numerous articles to the German dental journals. He was editor of Deutsche Zahnarztliche Wochenschrift from 1906-1911. In 1952 he published a book entitled Vom Zahnheilhandwerk zur Zahnheilkunde (From Dental Technic to Dental Science), a general history of dentistry to the present century.
ANCIENT PHOENICIAN PROSTHESIS REEXAMINED

The latest study of the two well-known early specimens of Phoenician gold wire prosthesis is "Nuovi studi sulla protesi dentaria fenicia" by V. Bertolino in Minerva Stomatologica 4:30-32, Jan.-Feb. 1955. The article gives a good summary of the circumstances involved, but adds no new evidence and arrives at no new conclusions. In English, Milton Asbell's "Specimens of the Dental Art in Ancient Phoenicia" (Bull. Hist. of Medicine 22:612-821 Nov.-Dec. 1948) covered the same ground and arrived at what appear to be the definitive conclusions. The problem of the Gaillardot prosthesis was conclusively dealt with by Jacques Fieldman, "Notice sur une prothese fixe, datant d'avant J. C." (Revue Odontologique 52:335-343 1931).

STORY OF DENTISTRY IN OKLAHOMA

Open Wider, Please: The Story of Dentistry in Oklahoma, just now published by the University of Oklahoma Press is an attractive volume of nearly 400 pages. On the whole, the author, J. Stanley Clark, historian, the Special Historical Committee of the Oklahoma State Dental Association, and the University Press are to be commended for the production of an unusually satisfactory history of a state society. In eleven chapters, the development of the practice of dentistry in the state has been traced in narrative form. To the 299 pages of this account have been added 83 pages of appendices, consisting mostly of names.

The demands on the author of a local history of dentistry or of any other occupation or profession are exacting, and several problems arise for solution. The problem of presenting a real history of the subject, that is, a developing narrative, has been successfully solved by the author. However, one great obstacle to narrative interest in a local history has not been completely avoided. The numerous names of persons and insignificant details which crowd into the story burden the narrative and lessen the interest. These cannot be altogether suppressed, but perhaps, it would have been sufficient recognition of the groups of persons involved to list these in footnotes, and eliminate them from the text in most instances. The only other point of criticism worth noting is perhaps the title chosen for the work, which, although "catchy", is perhaps less dignified than the subject merits.

The editor has on other occasions emphasized the importance of local histories of dentistry. If all the state societies would produce equally adequate accounts of their history, clearer and more complete account of the general development of dental organizations throughout the country could be written.

ANECDOTES OF EIGHTEENTH CENTURY DENTISTS

Under the title "Storie di Illustri 'Cavadenti'" Silvio Palazzi, in Nuova Antologia, (March, 1955, p. 377-388) recounts the adventures of various dentists of the eighteenth century--mostly non-professional incidents.
A. A. H. D. RECEIVES GIFT FROM GERMAN INSTITUTE

The gift of an interesting historical work for the Academy of the History of Dentistry has been received by the editor from the Senckenberg Institute for the History of Medicine, of the University of Frankfurt am Main. The book is a monograph entitled Der Zwiegeteilte Unterkiefer (The Bipartite Mandible) by Walter Arteit, director of the Institute. The work deals with the teaching through the ages that the mandible consists of two halves, joined together, and is presented as an example of the persistence of a false doctrine. The book was written in 1943 and its publication carried as far as the page proofs. Circumstances of the War have made press publication impossible, and therefore the book has been reproduced photographically in reduction. The Academy has received autographed copy No. 12. Professor Arteit is one of the most distinguished European historians of medicine, and has contributed much in the field of dental history.

FIFTIETH ANNIVERSARY OF ILLINOIS DENTAL JOURNAL

In the May issue, the Illinois Dental Journal celebrated the completion of half a century of publication. Several articles of historical interest appear in that number: a history of the Journal; some autobiographical notes by past editors of the Journal; an article on dental laboratory development in Illinois; a sketch of the Chicago dental schools; and a short sketch of development of the appurtenances of the dental office sold by the dental trade.

THE ROGERS FAMILY

As biographies XVI-XVIII under the title "Personalities of the Past", Lillian Lindsay has contributed sketches of the lives of Arnold Rogers (1796-1870), influential in the professional development of dentistry in England, and of his sons Thomas Arnold Rogers (1824-1913) and Henry Rogers (British D. J. 98: 363-364 May 17, 1955).

DENTAL DISEASE OF A FOSSIL MAN

"Krapinaunterkiefer I und Parodontose im Pleistozän" (Krapina Mandible No. I and Periodontosis in the Pleistocene Age) is discussed by Juraj Kallay in Österreichische Zeitschrift für Stomatologie 52: 5-63 Feb. 1955. The article deals in detail with the mandible of only one of the 28 Krapina men of whom remains have been found. The results of periodontal diseases and periapical osteitis were found, but no dental caries.
WOMEN DENTISTS IN ARKANSAS

Dr. F. W. Dietrich contributed a short account of the women dentists in Arkansas in the *Arkansas Dental Journal* 25: 9-10 Dec. 1954

LIFE OF FAUCHARD

A biographical sketch of Pierre Fauchard, by Balestra Marcollo, appears in *Clinica Odontolitrica* 10: (Parte Varia) 25-34 Feb. 1955. The article adds no new evidence or interpretation, and contains one or two questionable statements.

PREVENTIVE DENTISTRY AT THE MIDDLE OF THE LAST CENTURY


TITLES OF MEDICAL WORKS MENTIONING DENTISTRY

The earliest medico-surgical book that mentions dental treatment in the title is, according to R. A. Cohen (*British D. J.* 98: 218-219 March 15, 1955), *The Poor Man's Physician and Chyrurgion... with a Method for drawing Teeth*, published first in 1656, and again in 1663. Cohen brings up the problem, earlier discussed by Proskauer in 1943 and 1947, as to what works should be listed in a strictly dental bibliography, since many early medical and surgical works have sections dealing with the teeth and oral conditions. The rule prescribed by Cohen (following Proskauer's contention) is that in addition to works restricted to dental subjects, all works that mention dentistry or the teeth in their titles or on their title pages should also be included.

IDENTIFICATION OF HISTORICAL PERSONAGES

P. O. Pedersen under the title "Taender og tandsygdomme hos nogle historiske personer" (*Tandlægebladet* 59:197-221, Feb. 1955) studies the identity of certain historical personages from dental and skeletal remains. These include Absalon, medieval archbishop, 1128-1201; the seventeenth century nobleman Kaj Lykke; Col. Gregers Daa, killed in action 1712; and Counts Struensee and Brandt, executed in 1772.

THE ORIGIN OF THE "HEISTER"

An instrument for opening the mouth in cases of trismus, called in German the "Heister" after the surgeon Lorenz Heister (1683-1758), is discussed in *Zahnärztliche Praxis* 6:12 Jan. 1, 1955. The origin of this instrument commonly ascribed to Heister is disputed on the grounds that Heister was opposed to its use.
**Book Shop**

**A History of Dentistry in the US Army to World War II**

By John M. Hyson, Jr., Joseph W.A. Whitehorne & John T. Greenwood
890 pages hardcover

Dental health has been a core requirement for soldiers since the earliest military history. When the muzzle-loading rifle made strong teeth critical to the operation of weapons, dentistry as a profession did not yet exist to assure this element of soldier fitness. This book documents the reciprocal influence of the maturation of the dental profession, and establishment of Army dental care programs. The theme of symbiosis of civilian and Army dentistry defines this period of dentistry's history, in this well-illustrated volume, written by three accomplished historians. The project took over ten years and was initiated and supported by the Office of the Chief of the U.S. Army Dental Corps, and sustained during the tenures of five of the men who occupied that position.

Copies are available ($79) from the US Government Printing Office (http://bookstore.gpo.gov). Use the search function where the subject, title, first author (Hyson), Stock Number (008-023-00137-5) or ISBN (9780160821592) can be entered to locate the book. PDF file version will be available for download by May 2009 at the publisher's website (The Borden Institute).

**Limericks With A Smile: Dental, Oral and Facial Limericks of Yesterday and Today**

by Joan A. Christen, BGS, MA & Arden G. Christen, DDS, MSD, MA

The authors have compiled 188 previously-published limericks related to dental, oral and facial themes; plus they offer an additional 384 personally-composed limericks. The humorous verses in this collection are at once bawdy, whimsical, ludicrous and cynical, and though simple in format, they communicate in few words their strong, sometimes paradoxical message. 159 pages with complete index.

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**Intriguing and Eccentric Characters & Stories from the World of Dentistry**

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In this 230-page book, the authors have glimpsed into the lives of 32 dental characters: professionals who range from the noble to the bizarre. Introducing this work is a chapter on one of the most memorable and controversial characters of all time, Dr. Painless Parker (1872-1952). All of these fascinating individuals have left indelible marks on their chosen profession. The stories from this collection may be inspiring or infuriating, ingenious or absurd, credible or questionable—but seldom are they dull.

Price: $20, postage paid. Available from: Dr. Arden G. Christen, 7112 Sylvan Ridge Road, Indianapolis, IN 46240-3541 (US check only)

**A Little Treatise on the Teeth: The First Authoritative Book on Dentistry (1563)**

by Bartholomæus Eustachius
Edited by David A. Chernin, DMD, MLS & Gerald Shklar, DDS, MS

One of the greatest anatomists of all time, Eustachius’ major studies remained unknown until their eventual Dutch translation and publication in 1714. Eustachius contributed substantially to the development of dental science. His conceptual advances concerning tooth development and function, based on anatomical dissections, were further buttressed by detailed plates of the musculature of the face, floor of the mouth, the neck, the tongue, and the roots and crowns of the teeth. In addition to giving us the first clear description of the dental pulp and root canal, Eustachius also conceived of the periodontal membrane as a gomphosis. This volume presents the first direct English translation from the original Latin Libellus De Dentibus, and maintains the Latin and English texts on facing pages. Eustachius’ observations are an illuminating precursor to 21st-century medical science, and still represent a timely and relevant reference for any practicing dentist.

A Sourcebook of Dental Medicine
Being a Documentary History of Dentistry and Stomatology from the Earliest Times to the Middle of the Twentieth Century.

by Gerald Shklar, DDS, MS & David A. Chernin, DMD, MLS
864 pages, hardcover

The aim of this book is to make available to the profession of Dental Medicine and other interested parties the extensive literature of the past dealing with the diagnosis, description, causes, treatment and prevention of oral diseases. Drs. Shklar and Chernin are presenting the original texts concerning the diagnosis and management of oral diseases ranging from ancient Egypt through the world of the 20th Century.

Many of the basic texts of the past have already been translated into English, French and German from the original Sanskrit, Greek, Latin and Arabic. However, a number of important texts have never before been translated into English. The authors are presenting all these materials to the English-reading professionals in medicine and dental medicine in this 864-page reference book.

Price: $90. Available from: Maro Publications
Maro Pub. Ltd., P.O. Box 145, Waban, MA 02468
www.maropub.com

Painless Parker: A Dental Renegade’s Fight to Make Advertising Ethical

By Arden G. Christen and Peter M. Pronych

Throughout his professional life, Painless Parker—a self-promoting dental crusader and patient advocate—sought to gain respectability from the profession of which he was a member. Instead, he was rejected by his colleagues because he used the unacceptable practice of advertising blatantly to the public. The ultraconservative Profession of Dentistry regarded Painless as an outlaw, a renegade, a fraud, a charlatan, a quack, a scoundrel, a thorn in the side, and above all else—unprofessional. However, Painless may have been years ahead of his time as he can be credited with pioneering many innovative practices now accepted by modern dentistry. He developed and perfected the concept of group dental practice. As he stated, “You (the dentist) have to be organized, systematized, capitalized, advertised, standardized and specialized.” This 491 page book tells Painless’ story as he wanted it told: from his perspective, using many of his own words.

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