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Facial Fractures in Children: A Historical Perspective on Treatment Techniques

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The surgical principles for the treatment of facial fractures in children have evolved progressively over the past 70 years. In 1943 Waldron and colleagues published what is probably the first paper on the subject, thus setting a paradigm for the conservative treatment of pediatric facial fractures. This standard remained viable for about five decades. Therefore, during many years children with facial fractures did not benefit in the same manner as their adult counterparts from the multiple advances made in the management of facial trauma. In the 1990s craniofacial surgeons used plates and screws to correct craniofacial deformities in children with congenital malformations. As a consequence of their findings, pediatric oral and maxillofacial surgeons started to apply such principles to the management of facial fractures in young, growing patients, which eventually paved the way for the open reduction with external fixation paradigm. The aims of this article are to detail Waldron's initial directives, to evaluate the publications that contributed to its consolidation, and to analyze the factors that led to its challenge fifty years later.
**Introduction**

Over the last twenty years, many book chapters and clinical reports have described the use of miniplates and screws in children with facial fractures. Moreover, recent experimental studies using rabbits suggest that the use of metallic hardware in animal models with mandibular fractures does not alter the growing process.\(^1\) This philosophy is in juxtaposition to the amply-accepted conservative approaches that have guided pediatric oral and maxillofacial surgeons since 1943, when Waldron et al.\(^3\) published a landmark paper dealing with fractures of the facial skeleton in growing patients. In this report, the authors set a standard for the best way to use closed reduction and immobilization of pediatric facial fractures.

Although there is no scientific evidence that surgeons today are in definite favor of the use of miniplates and screws for facial fractures in this group of patients, the fact that some publications describe their use and advantages indicates that the standard set by Waldron and colleagues, which has dominated our understanding of this specific topic for seventy years, has been challenged and perhaps already replaced.

**Materials and Methods**

A search of the English literature was done. Key words for the Medline search were: facial fractures in children, pediatric maxillofacial fractures, mandibular fractures in children, maxillofacial injuries in children, management of maxillofacial fractures in children, effects of rigid fixation on cranial growth, effects of bone plating on craniofacial growth. In addition, relevant publications from the reference list of the retrieved papers were also considered. The matches were evaluated for relevance and analyzed accordingly. Reports dealing with maxillofacial fractures in children written in English and received until January 31, 2013 were considered.

**Historical development of the standard**

*Fractures of the facial bones in children*, published in 1943 by Waldron, Balkan and Peterson,\(^3\) is probably the first paper dealing with fractures of the facial skeleton in growing patients. The article, written in the midst of World War II (WWII), discussed etiology, type of facial fracture, dentition stage, patients' age, systemic related injuries, diagnostic methods, and management principles. Since the antibiotic era was just beginning, it is understandable that the authors did not mention their use. Recognizing the differences between adults and children (i.e., softer bones, presence of tooth buds, and the unique remodeling potential of the developing skeleton), they recommended closed reduction and immobilization with maxillomandibular fixation (MMF), thus setting a standard by which pediatric facial fractures were best treated conservatively (Fig. 1).

At the end of the 1940s, however, Reiter,\(^4\) Matthews and Magruder,\(^5\) and Kazanjian and Converse\(^6\) advocated other treatment modalities for the management of facial fractures. While Reiter\(^4\) described the placement of Kirschner wires for symphysis fractures, the latter authors reported the successful use of open reduction in young patients. Despite the fact that these recognized surgeons advocated for open reduction, the great majority favored conservative techniques as recommended by Waldron and coworkers.\(^3\)

During the following decade Waldron's standard was patronized by multiple authors.\(^7\)-\(^12\) In a series of articles that were published the 1950s, Georgiade *et al.*,\(^7\) Fried and Baden,\(^8\) MacLennan,\(^9,10,11\) and Panagopoulos\(^12\) emphasized the importance of treating injured children conservatively. In 1952 William MacLennan\(^9\) (Fig. 2) noted that fractures of the condylar process in young children could cause...
secondary growth anomalies from damage to the condylar growth center. Two years later Fried and Baden\cite{fried1954} mentioned that reduction systems should not interfere with mandibular growth.

In 1956 MacLennan\cite{maclellan1956} contraindicated not only open reduction with transosseous wiring of the bone fragments, but also the use of extra oral pin fixation because of the possible damage to the permanent tooth follicles. He endorsed manual reduction of the fracture and stabilization with a prefabricated acrylic Gunning-type lower splint with a thick lining of softened gutta-percha pressed into position over the lower teeth and maintained in position with circumferential wires. MacLennan believed that discrepancies in alignment would be adjusted by later growth.\cite{maclellan1956} In a 1957 paper, he agreed with Fried and Baden\cite{fried1954} by cautioning surgeons with the presence of secondary centers of ossification in the mandible, thus not recommending the use of transosseous wiring in kids.\cite{maclellan1957}

Although by the late 1950s authors such as Reiter,\cite{reiter1955} Matthews and Magruder,\cite{matthews1956} Kazanjian and Converse,\cite{kazanjian1958} Atterbury and Panagopoulos,\cite{atterbury1958} and Lal et al.\cite{lal1958} had advised the use of circumferential wiring for different types of mandibular fractures, at the beginning of the 1960s the use of external pin fixation, Kirschner wires and Steinmann pins was almost unanimously doomed due for three reasons: 1) risk of damaging tooth buds; 2) interference with mandibular secondary centers of ossification; and 3) scars, according to Graham and Peltier’s\cite{graham1960} 1960 report. For badly displaced mandibular fractures they recognized the superior advantages of interosseous wiring, therefore recommending open reduction in said circumstances. Graham and Peltier also noted a growing trend toward the use of open reduction with direct interosseous wiring in pediatric mandibular fractures, thanks to the advent of antibiotics, pediatric anesthesia, and improvement of surgical techniques. Damaging tooth buds was a major concern, but this impasse could be eliminated by carefully drilling the holes.
close to the inferior border of the mandible.\textsuperscript{15}

From the many publications that appeared by the early 1960s, four principles seemed to be applied by most pediatric oral and maxillofacial surgeons: 1) closed reduction and immobilization with bandages, MMF, splints or metallic external rods attached to a plaster of Paris headcap was the preferred method of treatment for most mandibular fractures; 2) external pin fixation, Kirschner wires, and Steinmann pins were to be avoided mainly due to the risk of damaging tooth buds, interference with growth centers and scars; 3) open reduction with direct interosseous wiring was the choice for badly displaced mandibular fractures; and 4) in the treatment of pediatric mandibular fractures, two principles were to be considered, those being early mobilization and a two to three weeks of fixation due to their high osteogenic potential and rapid healing process.

As the decades unfolded, many articles appeared both confirming and refuting previous findings, thus adding more elements to the equation. In 1966 McCoy \textit{et al.}\textsuperscript{16} summarized the state of the art in pediatric fractures of the facial skeleton; Rowe\textsuperscript{17}-\textsuperscript{19} studied temporomandibular joint (TMJ) lesions in children and discussed extensively on facial fractures; Rakower \textit{et al.}\textsuperscript{20} and MacLennan and Simpson\textsuperscript{21} also discussed on condylar fractures in growing patients. Walker\textsuperscript{22} and Boyne\textsuperscript{23} studied the effects on growth of condylar fractures in animal models and proved that fractured condyles had a remarkable healing potential, and that they would remodel with little growth abnormality after trauma.

Although Waldron \textit{et al.}\textsuperscript{3} included the term “facial fractures” in the title of their 1943 paper, they emphasized mandibular fractures and discussed little on other types of facial fractures, a pattern that would be followed by many authors throughout the years. In 1966 McCoy \textit{et al.}\textsuperscript{16} published a report of 64 cases where they, contrary to the norm, proposed open reduction and wire stabilization for most pediatric facial fractures. Regarding growth disturbances, the authors believed it was a difficult complication to evaluate. In the series of cases they analyzed, only 1 out of 64 patients had evidence of growth arrest. They concluded that except for nasal fractures, a properly reduced and stabilized facial fracture had no adverse effect on the growth of facial bones (Fig. 3).

Bony plates were introduced to maxillofacial surgery in 1945, when Christiansen\textsuperscript{24} used tantalum plates to stabilize displaced mandibular fractures in adults. But their use, even in adult patients, was not popular until the 1980s. It was during the late 1960s and early 1970s that many maxillofacial surgeons started to apply to the lower jaw the principles developed by orthopedic surgeons in long bone fractures. However, since growth disturbance concerns were under debate, the use of bone plates and screws was not considered a reliable option for children. In his 1968 \textit{Fractures of the facial skeleton in children}, Norman Rowe\textsuperscript{18} (Fig. 4) reinforced the idea that neither pin fixation nor intramedullary fixation should be used for mandibular fractures in
patients under growth.

With regards to growth disturbances, Rowe believed that when the middle third of the facial skeleton was involved, only severe nasoethmoidal injuries or gross disorganization of the orbit appeared to persist as residual deformities and they were basically of a local nature and the overall development of the facial bones was not impaired. Damage to the condylar growth center, he believed, could produce severe deformity in later life together with function impairment as the result of ankylosis. He concluded that crushing injuries affecting the condylar cartilage resulted in future noticeably deformity, especially when such injuries happened before the age of six.18

The decade ended with Rowe’s 1969 striking guidelines on how to approach pediatric mandibular fractures. He took the opportunity to reinforce what he had been advocating in earlier publications, which said that fractures could be effectively managed conservatively, using previously described immobilization methods such as bandage, splints, interdental eyelet wires, cap splints, and arch bars. For LeFort-type fractures in children above nine, internal skeletal suspension and transosseous wiring was the method of choice (Fig. 5). Rowe concluded that the treatment of the displaced zygomatic bone or orbital floor should be similar to that for adults. For condylar fractures, he noted:

The severe disruption of the growth center produced by such injuries restricts the treatment that ensures early mobility, prevents ankylosis, and preserves the growth potential that remains. Thus, careful observation with a view to the surgical correction of residual deformity at a later date is necessary. Any attempt at open reduction will serve only to aggravate the situation. It is time to state unequivocally that there is no indication for open reduction and transosseous wiring in the case of condylar fractures in children unless there is a mechanical interference with mandibular movement. A conservative policy offers the best chance of obtaining a morphologically and functionally acceptable condyle.19

During the 1970s and 1980s no major contributions to the issues at hand were made.

Fig. 4. Norman Lester Rowe (1915-1991). Greatly contributed to the birth and development of pediatric oral and maxillofacial surgery. Photo courtesy of the British Association of Oral and Maxillofacial Surgery.

Fig. 5. Reduction of a LeFort II fracture with a triple-rod external craniomaxillary device attached to a plaster of Paris headcap. Drawing by Carlos Figueroa.
The literature of that epoch either agrees or disagrees with the knowledge that had been under construction since the landmark paper of Waldron et al.\(^3\) and enriched during the following 30 years.\(^4\)-\(^23\) Those papers were valuable in the sense that they expanded the discussion on previously known aspects of pediatric facial fractures, such as incidence, etiology, location, age and sex distribution, and treatment modalities. Perhaps one of the few reports that challenged the conservative paradigm for the treatment of condylar fractures was that of Hoopes et al.\(^{25}\), where they advocated for open reduction and internal fixation using the post-auricular approach in cases where severe fracture dislocation had occurred.

Leake et al.\(^{26}\) studied 13 patients who had sustained condylar fractures and found neither mandibular growth disturbance nor occlusal abnormalities when treated with analgesics, liquid diet and if indicated, guiding elastics. Keniry\(^{27}\) favored conservative approaches for mandibular fractures. Khosla and Boren\(^{28}\) stated that the principles of treatment of mandibular fractures in children were basically the same as those in adults, a fact that had been recognized since the early 1950s. For mandibular fractures they recommended both conservative and direct interosseous wiring, according to the severity of the fracture.

In 1972 Bales et al.\(^{29}\) noted the many opinions available, ranging from conservative methods to open reduction with internal rigid fixation (ORIF). Condylar or subcondylar fractures were to be treated in a closed fashion because of the great hazard to either disturb the condylar growth center or disrupt the blood supply to the condyle with the risk of causing avascular necrosis. Hall\(^{30}\) advocated for both closed and open reduction, according to the severity of the fracture. Virtually not used at the time, it is interesting to note that he mentioned the use of four-screw plates for the reduction of mandibular fractures. The reasons for this lack of usage were the same related to wiring and external intraosseous pin fixation, those being the increased risk of damaging developing teeth and possible disturbance of growth centers.

During the 1970s Waite,\(^{31}\) Morgan,\(^{32}\) Lehman and Saddawi,\(^{33}\) Reil and Kranz,\(^{34}\) Lund,\(^{35}\) and Kaban et al.\(^{36}\) discussed different topics on the management of pediatric facial fractures. Lehman and Saddawi,\(^{33}\) for example, mentioned that the two main factors influencing the choice of treatment modality were the location of the fracture and dentition stage. Fractures of the mandibular angle and body generally necessitated MMF and the use of open reduction with direct interosseous wiring was left for badly displaced fractures when conservative methods had failed to produce satisfactory result.

In 1974 Lund\(^{35}\) published a comprehensive 38-patient prospective study in which he analyzed condylar growth patterns after orthodontic treatment. He found that the facial asymmetry that developed after condylar trauma would improve over time in almost 50% of the cases, grew longer than the side that was not affected, or became smaller than the unaffected side with worsening of the condition as time passed. In 1977 Kaban et al.\(^{36}\) reported both closed and open reduction. They believed that the simplest treatment was usually the most satisfactory one. Among the reports that were published during the 1980s were those of Adekeye,\(^{37}\) Fortunato et al.\(^{38}\) Ramba,\(^{39}\) Carroll et al.\(^{40}\) Gussack et al.\(^{41}\) and Amaratunga.\(^{42}\) The article by Fortunato et al.\(^{38}\) reported 92 fractures and it reflected the general state of the art in pediatric trauma at the time; treatment modalities included observation, closed reduction with arch bars, Ivy loops, stents, MMF, open reduction and internal fixation with wires and craniofacial wire suspension.

In conclusion, during the 1970s and 1980s pediatric oral and maxillofacial surgeons believed that although treatment of facial fractures varied with age and location, most of them could be treated by means of closed reduction and MMF, leaving open reduction for a badly displaced mandibular angle or body fractures where conservative approaches had failed. Towards the end of the 1980s, however, some surgeons started to use plates and screws for pediatric facial fractures on regular bases, but their use was not reported until the early 1990s. Being the logic and gradual evolution of direct osseous...
wiring advocated since the times of Kazanjian and his followers, \cite{4-6,15-16,28,30,33,38} the use of metallic hardware for reducing pediatric facial fractures challenged the sound standard that had served oral and maxillofacial surgery (OMS) well for a number of decades.

The last decade of the 20th century witnessed the widespread use of metallic plates and screws, and the development of more biocompatible, absorbable fixation systems. While some clinicians kept reporting their experience with pediatric maxillofacial trauma, \cite{43-49} others experimented with animals to study the effects of rigid fixation (whether metallic or biodegradable) on cranial growth.

In his 1993 paper \textit{Diagnosis and treatment of fractures of the facial bones in children 1943-1993}, Kaban\cite{50} summarized fifty years of knowledge by putting in perspective Waldron’s article. The paper started by referencing Waldron’s study and commenting on its context. He noted the advances made in the management of the injured pediatric patient such as airway, metabolism, anesthesia, antibiotics, and surgical techniques. The dozens of papers written before 1993 resulted into a better understanding of the etiology, incidence, and prevention of pediatric facial fractures. Kaban wrote:

The basic techniques for the management of mandibular fractures during the deciduous and mixed dentitions have undergone little change since 1943. Because of the presence of tooth buds and the softness of the bone, closed reduction and immobilization with either splints or combinations of splints and maxillomandibular fixation have remained standard treatment during the deciduous dentition.\cite{50}

In the following paragraph he noted that in the previous decades open reduction was avoided due to the risk of damaging developing teeth. With the availability of miniplates and screws—Kaban continued by citing Posnick \textit{et al.}\cite{51}—“open reduction and direct fixation could be used in all fractured areas of the mandible, except for the condyle, whose fractures continued to be managed with analgesics, liquid to soft diet, and either observation (in the absence of malocclusion) or a short period of immobilization (in the presence of malocclusion and pain)”.

Pertinent to midface fractures, Kaban recognized they could be treated by means of immobilization with mini and microplates, and pointed out the advantages of ORIF without MMF in children who had sustained multiple injuries. This was made possible thanks to the use of antibiotics. The article ended with some considerations on healing, infection control, growth disturbances, and the effects of ORIF on the growing skeleton. In 1993 this last point was a matter of concern, but according to Kaban attempts to produce growth abnormalities had failed and experimental studies, all limited to cranial growth, had produced equivocal results. He reasoned there was no reason why a static hardware should have a major effect on bone growth.\cite{50}

**Early use of plates and screws in children**

Open reduction for the treatment of mandibular fractures and stabilization with bone plates and screws goes back to 1945 when Christiansen\cite{24} used tantalum plates to provide stability to unstable mandibular fractures in adult patients. During the following years this modality was reported by Thoma,\cite{52} Freeman,\cite{53} Smith \textit{et al.},\cite{54} Rank \textit{et al.},\cite{55} Robinson \textit{et al.},\cite{56} Roberts,\cite{57} Luhr,\cite{58} Spieesl,\cite{59} Michelet \textit{et al.},\cite{60} and Champy \textit{et al.}\cite{61} Borrowing from orthopedic surgery the principles of long bone fractures, oral and maxillofacial surgeons began to apply such principles to the mandible, thus initiating what has been called “the modern era” of internal rigid fixation for facial fractures.\cite{62}

Hans Luhr\cite{58} (1968) is credited with introducing to OMS the compression plate system with bicortical screws placed into the lower border of the mandible. Michelet \textit{et al.}\cite{60} (1973) introduced the use of flexible, small, noncompression plates fixed with monocortical screws. Spieesl\cite{63} (1976) applied the Association for Osteosynthesis/Association for the Study of Internal Fixation (AO/ASIF) principles to the treatment of mandibular fractures, while Champy \textit{et al.}\cite{61} (1976) outlined the ideal
zones of osteosynthesis in the mandible using the monocortical, non-compression system developed by Michelet.60

Even though the use of bone plating for the reduction of mandibular fractures started in 1945 and that its clinical use was reported throughout the following three decades, this philosophy only became popular, along with the controversies associated to a new modality of treatment, in the 1980s.62 That is why the use of mini plates and screws for reducing pediatric facial fractures is virtually nonexistent prior to the 1980s. Authors who mentioned bone plating before the 1980s were Rowe in 1968 and Hall in 1972. Rowe’s statement highlighted the existing standards:

Bone plates normally do not have any place in the treatment of fractures in children although they might be considered as an interim measure in exceptional circumstances when there has been gross loss of bone tissue but there is adequate soft tissue cover present.18

Four years later, Hall gave bone plates surviving chances. Hall’s writing conveys the idea of a sound method that should not be sentenced to death, but to be used under certain circumstances. He concluded:

This treatment [open reduction with 8-figure wiring] is indicated in badly displaced angle fractures or body fractures where there are insufficient teeth to retain cast splints (Graham & Peltier 1960). Drill holes must be placed as close as possible to the lower border of the mandible in order to avoid damage to the developing teeth. Four-screw plates are used more rarely because of the increased risk of damage to developing teeth, and external intraosseous pin fixation of mandibular fractures has not been used in our hospital to date, for the same reason; however, it is considered that these techniques may have a place in the management of mandibular fractures in certain selected cases in children.30

Challenging the conservative standard

It is difficult to determine who was the first surgeon to use plates and screws in children, but information from the articles analyzed for this historical perspective seem to point to Posnick et al.51 as being among the first to use these devices and recognize their advantages in children. In a 1993 article entitled Pediatric facial fractures: evolving patterns of treatment, they reviewed the treatment of facial trauma given to 137 patients who sustained 318 facial fractures seen at Toronto’s Hospital for Sick Children between 1986 and 1990, reporting on the use of plates (mini or micro) and screws for mandibular, orbital, and midfacial fractures. The last section of the paper discussed what was rapidly becoming a controversial topic that being closed vs. open reduction and the use of plates and screws. Based on the principles outlined by Graham and Peltier15 and Rowe19 (which in turn were rooted on Waldron’s 1943 recommendations), Posnick et al.51 recognized that in the early 1990s conservative management was still the norm. They believed, nevertheless, that precise anatomic reduction and internal fixation was the best treatment for complex pediatric facial trauma, since minimal reduction and fixation in comminuted, displaced fractures would result in contour deformities and malunion with the subsequent need of secondary reconstruction. Furthermore, they did not believe children’s remodeling potential would be sufficient. Therefore, whenever open reduction was indicated, they advocated the use of plates and screws. Regarding concerns with growth problems, they did not find short-term abnormalities. Their report concluded with four important remarks: 1) advantages of plate-and-screw fixation in the pediatric population were early release of MMF, decreased necessity for tracheostomy for airway management in the polytraumatized patient, and early mobilization of
the TMJ; 2) removal of hardware upon healing was not recommended; 3) development of absorbable devices was viewed as an alternative in the reduction of pediatric facial fractures; and 4) the effects of internal rigid fixation in growing patients could be better understood with the publication of long-term prospective follow-up studies of children who had undergone this treatment modality.

A new paradigm of treatment seemed to arise during the late 1980s and early 1990s, as ORIF started to be used and to be reported on more frequently, although the philosophy towards conservatism was the continued standard. Subsequent to Posnick’s et al. 1993 report, the amount of papers and book chapters on this topic increased significantly until gaining the attention of pediatric oral and maxillofacial surgeons. Authors who challenged the conservative paradigm and advocated for a new philosophy were Bartlett and DeLozier,64 Alpert,65 Infante Cossio et al.,66 James,67 Posnick,51,68-72 and Berryhill et al.73

In 1992 Bartlett and DeLozier64 tackled the matter with Controversies in the management of pediatric facial fractures, where they roughed out managing principles of treatment. They advocated for the least invasive approach that allowed stable reduction and, if plates and screws were to be used, they should be removed. They were cautious in recognizing that microplates should be used whenever possible and did not hesitate in providing the same warning that had been expressed since the middle of the 20th century, that being to avoid injury to developing tooth buds and the possible effects of treatment on growth and development. In 1994 Infante Cossio et al.66 documented the use of miniplates in jaw fractures and advised placing screws at the mandibular inferior border, away from developing roots. Since the follow-up period was short, they could not draw conclusions on facial growth alterations. In the same year Posnick, who is arguably the single most important surgeon who tussled for the introduction of the new paradigm, indicated that:

The surgical management of facial fractures in children has evolved gradually. Children sustaining facial fractures have not benefited equally as their adult counterparts from the rapid refinements in the management of facial trauma. Only recently have the distinct advantages of accurate primary repair of facial fractures been applied to the rehabilitation of the injured child.71

Conclusion

The treatment of facial fractures in the pediatric age group today is different than it was in 1943. During the past 70 years, many new concepts, techniques, and materials have been developed and introduced to the specialty, while others have fallen into disuse. Since the study of Posnick et al.,51 pediatric oral and maxillofacial surgeons have been using ORIF on more regular bases. This trend soon led many surgeons to question whether or not metallic hardware would interfere with normal growth. Disadvantages associated with titanium plates encouraged the development of more biologically compatible materials.74 Although the clinical introduction of the first resorbable system (LactoSorb, Walter Lorenz Surgical, Jacksonville, FL) occurred in 1996,75 presently there is an intense metallic vs. resorbable material debate. Recently, Bos76 defended metallic fixation, while Eppley77 did so with resorbable plates and screws. Currently, a large number of papers, book chapters, and textbooks describe the use of bone plates for the management of pediatric facial fractures.

Acknowledgements

I would like to thank painter Carlos Figueroa for the drawings specially made for this paper. Many thanks to the Royal College of Surgeons of Edinburgh and the British Association of Oral and Maxillofacial Surgery for granting permission to reproduce the photos of Drs. MacLennan and Rowe, respectively.
References


Many clinicians have used hand instruments that bear a wide variety of alpha or alphanumeric designations, such as a Michigan Probe, DP 2 Dressing Pliers, SRPG11/129 Curette, AB 1 Boghosian, or RCSD11T Spreader. Most clinicians have no interest in the name of these instruments, as long as they provide the necessary support for the task at hand. In the inquisitive mind, however, one might wonder how some of these instruments got their names. Needless to say, some designations are intuitive, such as the Glick #1 plastic instrument named after Dr. Dudley Glick, a famous Southern Californian endodontist; other name origins are not so intuitive. For example, within the scope of contemporary Endodontics, the DG 16 endodontic explorer is the global standard for thousands of clinicians... but asking those thousands what the DG stands for might create a fair amount of consternation, without a correct answer. While many might suggest that the DG stands for Dudley Glick, they would be wrong. The DG 16 was designed by Dr. David Green in 1951, who was from upstate New York. The instrument was designed in its present form because a straight explorer and a cowhorn (#23) explorer did not enable the endodontist to locate a vast majority of canal orifices, especially in the posterior teeth. Additionally, it enabled the clinician to better determine the angle of the canal orifice as the canal exits apically from the chamber. It ultimately was manufactured in three forms: a DG 16, a DG 16/17 and a DG 16/23, each having a specific function that enabled the successful performance of both non-surgical and surgical endodontic procedures.

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During the British raj, India attracted dental practitioners from all over the world who set up practices in the Presidency towns of Calcutta, Bombay, Madras and Bangalore. Lured by the abundant opportunity to make good money, these mercenary but courageous dentists counted Viceroy, Indian royalty and political leaders amongst their clients. Some, like the famous American Smith Brothers of Calcutta, were sought after even by the rulers of neighboring countries. Dr. Mark Smith’s hazardous visit to the Amir of Afghanistan made worldwide headlines more than 100 years ago for the fabulous fee he was paid for the dental treatment. This paper briefly describes the exploits and experiences of the Smith brothers while in India.

The most famous of American dentists in India during the British Raj were the brothers Daniel and Mark Smith, who set up their practice on two floors of a stately building on Chowringhee Road, the grandest address in Calcutta. Both brothers were graduates of the Indiana Dental College. The older brother, Daniel, originally from Mount Carmel, Illinois, came to India in 1897, since he anticipated a good opportunity to make money and build up a big practice. He did both with spectacular success. He had not been in India long when his younger brother, Dr. Mark L. Smith, followed him. Business was so good that they were obliged to add several other young American dentists to their force.¹

A visit to their chambers by Dr. H.L. Ambler in 1910 gives a good idea about their practice: “They have several rooms and assistants. Fountain cuspidors, foot engines and lathes are in evidence, but some say they use electric engines and lathes. Drs. Smith have their residence, office, laboratory and dental depot in the same building on a good street. In the depot they have goods from White and Ash, and here we met (almost) Dr. F. G. Hawksworth, who is doing this Eastern country for The S. S. White Company.”² The American dental surgeons worked here under the name of “Smith Brothers” until 1920, when they finally left India. They also had an office at Darjeeling where they seemed to own several properties, two of which have been converted into charming guest-houses called Wigwam House and Classic Guest House (Fig. 1).

In spite of their very successful career in India, the Smith brothers came to the attention of the American media only when Dr. Mark L. Smith made a trip to Afghanistan to treat the Amir. It was exactly 20 years earlier that Dr. Alfred O’ Meara of Shimla had undertaken a similar trip to treat Amir Abdur Rehman, father of the then presiding Amir.

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At a time when a dentist in America could expect to earn somewhere in the area of $2,500 a year (by comparison, the average American made between $300 and $500 a year at twenty-two cents an hour), Dr. Smith was paid the fabulous sum of $10,000 to fill ten teeth for the Amir. According to reports, the dental work consisted of four gold and six amalgam fillings, for which Dr. Smith was paid $6,000. The additional $4,000 was expended by the Amir in conveying the dentist from Calcutta to Kabul, the capital; his entertainment while in Kabul; and the return to Calcutta. Thus, it cost the Amir $1,000 for each tooth that was filled.

The Washington Times Magazine of April 7th, 1907 (Fig. 2) reported the story:

An escort of sixty horses and forty horsemen was sent to conduct him to Kabul, which is in the Hindu Kush mountain range, thousands of feet above the sea level. The doctor was away from his office two months, so the Amir really paid him for that amount of time. The actual time of filling the teeth was only a few days, the rest of the time being consumed on the journey to and from the Amir’s capital.

Since part of the journey was through the snow-covered mountains of northern India, the Amir presented Dr. Smith with an elegant and expensive Pashtun overcoat, and with a warm Pashtun rug. On arriving at Kabul the young American was treated with all the honor and respect which would have been paid to a princely visitor. He was given a large and splendidly-furnished suite of rooms in the Mehman Khana, or state guesthouse. Here he was attended with servants, who saw that his every want was satisfied and that nothing which could add to his comfort was lacking.

On the second day after his arrival the Amir’s representative called on Dr. Smith and announced that his highness would be pleased to
see the “renowned doctor.” The doctor was escorted in real oriental style to the palace. There he was received by the Amir, Habibullah Khan, Sraj-ul-Millat-wuddin. Having been treated so well, Dr. Smith was very sorry in some ways when the time came for him to start on his return trip to distant Calcutta. The Amir was so much pleased with his American dentist that he declares he will summon him to Kabul again when he has any more teeth that need to be filled.

The house at 9 Chowringhee Road (now Jawaharlal Nehru Road) until recently, displayed the signboard of Drs Smith Brothers, Dental Surgeons. Their spacious chamber on the first floor was occupied by Dr. Sumit Kumar Basu, himself a dentist. The building, which was said to have been leased from Sir David Ezra, the Baghdadi Jewish real estate baron and philanthropist, had a stately wooden staircase like its two companions. Basu’s chamber with high ceilings boasted elegant wooden furniture and huge concave sofas that had seen better days. The waiting room lead to a tiny terrace crowded with flower-pots overlooking Chowringhee. The wafer-thin and convex bricks in the columns testified to the antiquity of the building. Unfortunately, with typical government apathy toward heritage buildings, this building was set to be razed to the ground in order to build a high-rise monstrosity in 2011.5

References


4. $10,000 In Gold For Filling 10 Of Ameer’s Teeth. The Washington Times Magazine. April 07 1907: 7

In 1874, a three year-old little girl from Summerville, Ohio fell and avulsed her maxillary primary central incisors. Her father, Dr. John Randall McGinnis, the town dentist, emphatically did not want his child running around without her upper front teeth. Consequently, he fabricated to serve as her replacements a vulcanite interim removable partial denture with two porcelain primary central incisors (Figs 1a & b). Presently, this restoration is a family heirloom belonging to Dr. McGinnis’ great-granddaughter. The appliance is in remarkable condition containing absolutely no cracks or chips. It was very skillfully made, exhibiting very fine detail on the intaglio surface, including a “suction chamber”\(^1,2\) and a finely finished cameo surface.

At age 14, John Randall McGinnis was a drummer boy who saw combat during the American Civil War. After the war, he went on to become a school teacher. He eventually attended the Baltimore College of Dentistry, where he received his DDS degree prior to his return to Ohio. Dr. McGinnis carried on the practice of general dentistry in Summerfield from sometime before 1902 until his death in 1920.\(^3\)

Among the wide variety of porcelain denture teeth available in America in the late 19\(^{th}\) and early 20\(^{th}\) centuries were a number of primary tooth molds. Dentsply (York, PA) even provided primary teeth in their “porcelain gum” line (Fig. 2). Porcelain gum teeth were intended to be used on vulcanite denture bases. A pink gingival porcelain veneer was added enblock to a series of porcelain teeth with the intent of masking the orange color of the vulcanite base. Porcelain gum teeth were common in the early 20\(^{th}\) century;\(^2,4\) however, a card of porcelain gum primary teeth is a very rare find today. Porcelain gum teeth fell out of favor with the advent of acrylic resin dentures bases in the late 1930s.

References

3. Personal communication. Mrs. Jane Bartlett, great granddaughter of Dr. McGinnis, who fabricated the appliance.

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Figs. 1a. & 1b.
Vulcanite transitional removable partial denture with porcelain primary maxillary central incisors and a suction chamber. Courtesy of Mrs. Jane Bartlett.

Fig. 2. Dentsply “Porcelain gum” primary teeth. Courtesy collection of the author.
Johann Baptist Spix and the “Lingula Mandibularis”

Johann Baptist Ritter von Spix (1781-1826), a German zoologist, was famous in his time and highly honored after making one of the first exploration voyages in the wildest part of Brazil. He was almost forgotten in the annals of history for nearly two centuries after his birth, at which time some enlightened biographers brought him back into prominence in both the biological and zoological fields. On the contrary though, he had never been forgotten in the science of odontostomatology thanks to his discovery of the “Lingula Mandibularis” also known as “Spine of Spix”. Johannes Baptist Spix was born in Hoechstadt, Germany in 1781. He was the Conservator of the Museum of Natural History in Munich and was a distinguished Comparative Anatomist. He died Munich in 1826. The purposes of this work are to present some biographical notes on J.B. Ritter von Spix, to explain why the “Lingula Mandibularis” has been called by the name of Spix and why this eponym has been used as such.
Introduction

The anesthetic block of the inferior alveolar nerve (third ramification of the trigeminus) requires the injection near the bone that the anatomists call “lingula mandibolae” or “lingula mandibularis,” but it is better known as the “Spine of Spix” in the science of odontology.1-6 The “lingula,” which means “small tongue,” has been described as a bony protuberance that partly covers the mandibular foramen. Because it was first described by Johann Baptist Spix, it has been called “Spix” or “the small bone of Spix” or “the ossicle of Spix.”7 In 1962, Dobson in his Anatomical Eponyms wrote about Spix’s Ossicle and the Spine-Lingula of the Mandible.

While Spix’s paternity on this subject is evident, the aim of this work is to provide more biographical background on J.B. Ritter von Spix; to explain why the lingula has been identified by the eponym of Spix; and the reason for the term’s widespread use.

Bibliographic Notes on Spix

J.B. Spix (Fig. 1) was born in 1781 at Hoechstadt an der Aisch in Franconia, the seventh of eleven sons. At the age of eleven (1792), he attended the Episcopal School in Bamberg. He was a boy of fragile physical constitution, without financial resources, but with exceptional intelligence. His father, who died when Johann was still a child, “was a barber, dentist, chemist and a surgeon.”8 From his mother, the daughter of an Italian merchant, Spix said he had inherited an impulsive temperament, while from his father he inherited the love of research on nature.8

In the Seminary of Würzburg, Spix attended the lessons of the philosopher F.W.J. Shelling and the naturalist Lorenz Oken, of whom he became disciple and friend. Following the advice of Shelling he studied medicine, obtaining his degree at Würzburg in 1806.9

Thanks to a scholarship in 1808, Spix became a pupil of G. Cuvier in Paris, and was able to follow the teaching of J.B. de Lamarck and F.G. Saint–Hilaire. Further pursuits led him to Italy (particularly to Naples and on the Vesuvius) for studies that focused on marine biology. Returning in 1810 under orders of the King of Bavaria, he was called to the Royal Academy of Sciences in Monaco as an Associate Member. Soon after he was appointed Conservator of the Royal Zoological Collection, and in 1813 he was initiated as a member of the Academy. In 1815 he published Cephalogenesis (Figs. 2 & 3), which was a comparative anatomical

Fig. 1. Johann Baptist Ritter von Spix

Fig. 2. Title page of Cephalogenesis.
Fig 3. Illustration from Spix’s Cephalogenesis.
study on the development of the cranium (skull) in many animals. His work was even quoted even by Goethe with admiration. In 1816, together with the botanist Carl Friedrich Martius, he received Royal order to set out on a research voyage to Brazil that lasted about four years.

The two researchers came back from this voyage in 1820 with a rich zoological collection: 85 species of mammals, 350 of birds, 130 of amphibians, 116 of fish, 2,700 of insects and arachnids, 80 crustaceans, and 6,500 species of plants. His collection also included minerals, and a vast assortment of objects of anthropological interest: hats, weapons and objects of everyday life. He even brought back a young man of the Juri tribe and young woman of the Miranhas tribe; but they could not tolerate the German climate and died shortly after, both at the age of fourteen.

Both Spix and Martius were made noblemen by the King (giving them the title of von before their surnames); in addition, Spix was named Counsellor of State. The two researchers had taken an unimaginable voyage of 10,000 km, which was described in their detailed journal: mostly on foot, sometimes suffering thirst and hunger, the risk of hostility from the natives, and severe attacks of fever. This developed in Spix, who was thirteen years older than Martius, a constant weakening of his health that contributed to his death in 1826. One of the main biographies on Spix (E. J. Fittkau) indicated that he may have suffered from Chagas’ disease or “American trypanosomiasis;” another biography (K. Schonitzer) suggested “Framboesia” as a more probable pathology.

In his last years, Spix described the vertebrates he brought back in five large illustrated volumes that still are the basis for the classification of the tropical fauna in South America; he also wrote a remarkable number of scientific works in the biological and zoological field.

Spix was a distinguished figure in Munich during his time, but after his death he was nearly forgotten. More than 150 years after his death only the contributions of the two above-mentioned biographical authors and a few others have brought to light his accomplishments. Today, a scientific magazine, *Spixiana*, is named for him; and a monument to him (Fig. 4) was erected in his native village.

**Origin of the Eponym**

The eponym takes its origin from Spix’s identification not of the Lingula but of a bony nucleus of works that would identify his efforts. In fact, Spix wrote in his *Cephalogenesis*.
Autenrieth utrumque ramum ex tribus aut quatuor punctis osseis conflatum propugnat: "processum nempe condyloideum et coronoideum, inquit, dua propria ossicula reliquee maxillae intrusa, partemque maxillae angularem proprium punctum osseum prodere." Quo ad nos attinet, quatuor illa ossicula ab Autenrieth indicata, non modo ipsi observavimus et delineando expressimus, verum etiam praeterea observavimus, laminam canalem alveolarem intus obtegentem (Fig. V, 5) usque ad mensem quartum ossiculum sejunctum esse et inde paulatim concrescere, lineam internam prioris separationis vestigium reliquens.

Translation: Autenrieth affirms that the two rami (of the mandible) are generated by three or four cores of ossification; certainly two proper ossicles, implanted on the mandibular body, produce the condylar and coronoid process, and a third bony nucleus produces the angular portion of the mandible. As far as we are concerned, not only have we observed and described four of the ossicles indicated by Autenrieth, but also we described a lamina covering the alveolar canal inwardly (Spix refers to the Fig.V of his text; see Fig. 5) up to the fourth month the ossicle is separated and then, little by little, it blends, leaving an internal line as an evidence of the previous separation.

Most probably the eponym is linked to the quotation of Meckel in his famous treatise on *Human Anatomy* and which was translated into different European languages when he wrote: “Spix not only identified the bony nucleuses stated by Autenreith, but he also described and drew a fifth nucleus, a lamina that closes the alveolar canal inwardly, and that for him is distinct and separated up to the fourth month of fetal life.”

**Conclusion**

In addition to the biographical works and articles quoted for our research, we can verify that Spix has not been entirely forgotten in the fields of medicine and odontostomatology, thanks to the small bony spicule that has retained his name.
References


Longing for Modern Composite Materials in the Late 1800s

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Restoring teeth in the late 1800s required ingenuity and creativity, as the materials available were a far cry from is presently used. Likewise, restorative preparation designs had not yet been promulgated by GV Black. Concerns about both restorations that contracted due to the nature of the filling material and retention of sound tooth structure in favor of cutting away dentin and enamel in order to place “metal caps” were held by many dentists. While some dental professionals had a vision for the ideal restorative materials, they made do with what they had in an attempt to provide quality dentistry.

In 1881, Dr. Stewart J. Spence of North San Juan, California lamented over the fact that ideal restorative materials were not available to meet the restorative needs of his patients. In his small contribution to the Dental Cosmos, he expounded on both his frustration and his vision; yet he proceeded to provide the best treatment with what he had available for tooth preservation:

The position of the dental profession of to-day, as regards filling teeth, may be said to form an interrogation point. It is standing in an attitude of expectation, scanning the horizon for the arrival of the ideal filling. Metals expand and contract and let in moisture, or else they discolor and look offensive; the mineral pastes are friable externally and irritative internally; gutta-percha is most excellent internally, but too soft for outward use; neither is the ideal filling, and perhaps in the present state of dentistry there is no better practice than to combine the three, while we await the advent of that filling which will neither contract nor discolor, neither wear under mastication nor dissolve in oral fluids, of the color of tooth-substance, and as compatible with the pulp.

In the meantime it is well for us, with Laertes, to “hear each man’s counsel.” In offering mine, I shall define that particular mode of using in combination the three materials already mentioned which appeals to my understanding as the most appropriate in a large number of cases.

As metals contract from all points towards a center, it is evident that a metallic plug, in contraction, is not only drawn away from the side-walls of a cavity, but also from its floor and mouth, and that this latter is in proportion

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to the length of the plug. The “metallic cap” admits only the minimum of contraction in this direction.

In excavating a cavity for gold filling, it has been customary to cut away a large area of firm enamel when overhanging subjacent decay. While this may be good practice when it eradicates suspicious-looking fissures, yet in numberless cases it bears the character of accommodation of the royal metal, and unquestionably increases the contraction of the plug at the orifice, thus admitting the moisture which we are told converts our filled tooth into an electric battery, and which undoubtedly does increase the conductivity of the dentine, and thus tends to endanger the pulp. The metallic-cap manner of filling does not demand so great a sacrifice of enamel, and thus admits less shrinkage across the orifice.

The gist of the operation being advocated is simply this: Fill the bulk of the cavity to the inner edge of the enamel with some non-conducting material, and cap this with metal held in by a slight overhanging of the enamel walls.

I proceed in about this manner: When excavating the chamber, I avoid cutting the orifice as wide as the body of the cavity, and, by holding a fissure-burr at an angle of about ten degrees with the axis of the cavity, level away the enamel inwards on two opposing sides (this is to retain the metallic cap); then level outwards, very slightly, the sharp and ragged edge of enamel to insure against its chipping off under the mallet, and to permit that firm compaction of gold, when used adhesive, which an upward-inclined surface favors; then burnish the excised enamel; dry with heated air, and disinfect with carbolic acid diluted with alcohol; varnish with sandarac varnish sold at the depots, diluting it first with about fifty per cent, of alcohol. Place gutta-percha over the floor of the cavity, if it be large or the pulp in danger of irritation. I use a solution of the gum from which the chloroform has been permitted to evaporate, until the result is a material but little softer than ordinary cheese. In this condition it packs easily, and does not cling to the instrument or mouth of the cavity; it also hardens sufficiently almost immediately.

This substratum being laid, the next step is to employ a material which will adhere so tenaciously to the dentine as to prevent the intervention of moisture. The mineral pastes present themselves. Using the phosphates of aluminum and zinc, I compress it firmly into the cavity until the lower edge of the enamel is reached—not merely lining the chamber, but filling it (almost)—so that should the metallic part come away, at any future period, the sub-filling is in a much better condition to remain firm than if the cavity were merely lined. If the enamel is thin, and it is desired to give a concave contour to the cap when finished, it is well to sink a slight concavity in the cement, so as to give the desired strength to the metallic cap. In a few minutes a cap of any metal may be put on. If amalgam be employed, I use it cold, condensing with the mallet, and scrupulously avoid overfilling the cavity, scooping away the mercury which rises to the surface; then, with a piece of spunk held in the foil-carrier, pat and press the surface until it is smooth, level with the orifice, and contoured according to the adjoining contour of tooth; avoiding, as much as possible, any angle at the union of the tooth and filling—such angle not only rendering burnishing difficult, but offering hospitality to the enemy. The advantages of this course may be expressed thus: The minimum contraction of a metallic filling is reached. The minimum conductivity of a filling, when employing metal at its surface, is approximated. Moisture is excluded from the dentine. Discoloration of the tooth is obviated. Bruising of the dentine by the mallet is avoided.

References

This fabulous French advertising trade card (Figure 1) is one of a series of cards issued during the time of the 1900 Paris Exhibition, upon the theme “In The Year 2000.” These “Hundred Years Hence” cards anticipated technological advances of the 20th century. It is stunning and eerie to view the front of this card picturing “Le photo telephone.” In a prescient duplication of today’s Skype or FaceTime, this monocled, bow-tied grandfather and dressed-to-the-nines grandmom are chatting and viewing their family from afar, on a screen as large as today’s common flatscreen televisions. Even the boxes and wires of the machinery are surprisingly reminiscent of today’s hardware. We will never know how the artist working for IMP J CHARLES printer of Paris conjured up this remarkable prediction over a hundred years ago, but that 19th century Nostradamus fell just a tad short of perfect, for not predicting that the screen image would be in true-life color.

The text on the reverse of this card (Figure 2) represents a splendid self tribute to Professor John Parain, “Docteur Américain Dentiste.” With a magnificent array of fonts, both small and upper-case braggadocio, Dr. Parain states why 10,000 testimonials recommend his establishment for dental care. An English translation is shown in Figure 3.

But who was Dr. John Parain? Was he really the dentistry superstar that he claimed to be? Pierre Fauchard has been called the Father of Modern Dentistry, and certainly his 1728 book, *Le Chirurgien Dentiste*, and those of other French dental authors afterward, pushed French dentistry to a most respected position worldwide. However, that would soon change.

The first dental school in the world, the Baltimore College of Dental Surgery, was opened in 1840. That same year, the first national dental organization was founded, the first dental journal began, and a host of dental reference books were published, many of them translated from the French. American dentistry and American dentists were gaining world acclaim especially among royalty and the nobility. Soon American dentists were perceived by the French public to be superior to their own practitioners. This was strengthened by the Doctor of Dental Surgery degree, in contrast to many other countries, where dentists were referred to as mister. As a result, some French clinicians sought out an American education; other less scrupulous individuals simply professed and falsely advertised a claim to an American education. The British dental journals in particular stated that some British dentists were able to obtain an American degree without even crossing the Atlantic, from one or two diploma-mill dental schools in the United States.

The American Dental Society of Europe (ADSE) was founded in 1873, at a mountain-resort hotel close to Lucerne, Switzerland. Five United States citizens, practicing dentistry in their adopted European countries, were elected officers. They were
President, Dr. C.T. Terry, of Zurich and later Milan; Vice-President, Dr. James Gilbert Van Marter (1835-1901), of Basel and later Florence and Rome; Recording Secretary, Dr. C.M. Wright, of Basel; Corresponding Secretary, Dr. N.W. Williams, of Geneva; Treasurer, Dr. G.W. Fields, of Geneva; and Executive Committee, Drs. Van Marter, Fields, and Williams.

A major concern and a primary reason for the establishment of the American Dental Society of Europe was that “certain European dentists falsely claimed to be ‘American dentists’ and, not having the requisite skills, were beginning to cause the reputation of the genuine Americans to be undermined.” According to the ADSE today, “there is only one international society of greater longevity, that being the International Red Cross.”

We have been unable to prove that Parain was or was not an American graduate, but we strongly suspect he was not. Rather than using DDS after his name, he had SGDG, and he may very well have appointed himself “le Professeur.” He was also a prolific advertiser—a practice frowned upon at the time by orthodox practitioners.

Authors’ note: Drs. Croll and Swanson gratefully thank Ms. Emily Golden for her erudite translation of the French text, fonts and all!

Continued on the following pages…
UN PROGRÈS SÉNSATIONNEL
par le Professeur
John PARAIN
Docteur Américain Dentiste
Médaille d’Or Exposition 1900
PARIS - 142 Rue de Rivoli - PARIS

AVIS
Avant de commander un dentier complet ou partiel, je vous engage à venir voir mes modèles que je tiens gracieusement et gratuitement à la disposition de mon honorable clientèle.

BRIDGE WORK JOHN PARAIN. Aucune trace d’artifice visible
Mon nouveau système de pose de dents sans plaque sans crochets, sans extractions et sans la moindre douleur, est à préférer car aucun autre ne peut lui être comparé.

Ce PROGRÈS SÉNSATIONNEL, est un travail à pont exécuté avec talent ; il peut certainement dispenser la personne de porter une plaque. Il est la solution la plus élégante au problème de la restauration des arcades dentaires. Il est donc désormais inutile d’extraire les dents et les racines malades ou ébranlées, elles se guérissent et se consolident sur place par mon nouveau Sérum (Ma propriété exclusive).

ANTISEPSIE RIGOUROUSE
Mon Dentier complet blindé est garanti à l’usage 10 ans
Redressement des dents des Enfants sans douleur (nouveau procédé invisible)
ÉMAILLAGE - PLOMBAGES - AUERIFICATIONS
TOUTES LES MALADIES DE LA BOUCHE SONT GUÉRIES EN 3 JOURS SANS DOULEUR
par mon nouveau Sérum (propriété exclusive)

Maison de Confiance - Tout est garanti - Facilité de paiement

NOTA. - Afin de prouver la valeur de ma nouvelle découverte j’offre gratuitement les pansements calmants, ainsi que les consultations; tous les jours de 9 à 6 heures, dimanches et fêtes jusqu’à midi.

Plus de 10000 Attestations
Ne pas confondre 142, RUE DE RIVOLI - PARIS

Figure 2.
SENERSATIONAL PROGRESS

by Professor

John PARAIN
American Dentist
Gold Medalist 1900 Exposition
PARIS – 142 Rue de Rivoli – PARIS

NOTICE
Before ordering a complete or partial denture, I invite you to come see the models that I put graciously and free of charge at the disposition of my honorable clientele.

BRIDGE WORK JOHN PARAIN. No trace of visible artifice
My new system of placing teeth without a plate, without hooks, without extraction and without the least pain is to be preferred because no other can compare to it.

This SENSATIONAL PROGRESS is bridgework executed with talent; it certainly may permit a person to dispense with a plate. It is the most elegant solution to the restoration of the full set of teeth. It is therefore now unnecessary to extract the teeth and sick or loose roots, as they heal and consolidate themselves in place with my new Serum (my exclusive property).

RIGOROUS ANTISEPTIC MEASURES
My false teeth fortified with gold guaranteed for 10 years starting at 60 francs
Rectifying children’s teeth without pain (new invisible procedure)
ENAMELING – ROOT CANAL – GOLD CROWNS
ALL THE MALADIES OF THE MOUTH ARE HEALED PAINLESSLY IN 3 DAYS
by my new Serum (my exclusive property)
Trustworthy business – All work guaranteed — Easy payment

N.B. – In order to prove the value of my new discovery, I offer for free soothing dressings as well as consultations; daily from 9 to 6, Sundays and holidays until noon.

More than 10,000 testimonials

Not to be confused: 142 RUE DE RIVOLI – PARIS

Figure 3.
Don’t Chew the Rag!

This full color embossed lithographic British postcard was copyrighted in 1909 by Raphael Tuck and Sons, Ltd, London. Printed in Saxony, Germany, it belonged to the Post Card Series No. 165 (a set of 24 cards), entitled, “Knocks—Witty and Wise.” In 1893, Tuck Ltd., was granted a Royal Warranty by Queen Victoria, and thereafter, the company was proudly known as the “Art Publishers to Their Majesties the King and Queen.” Tuck, with offices in London and Paris, entered the U.S. postcard market in 1900. Although artists in America designed many of Tuck’s postcards, they were generally printed in Germany and England. However, millions were returned to the U.S. for commercial sale. On both sides of the card, in the right and left corners, is the tiny, Tuck “Artistic Series Trade Mark”—a painter’s palate holding a fan-like display of brushes which are positioned at the foot of an upright tripod. On this easel is a painting with ornate lettering, spelling out the letters “RTS” (Raphael Tuck and Sons).

This particular card was drawn by 35-year-old Clare Victor Dwiggins (1874-1958) a well-known American cartoonist and illustrator. He produced his humorous works principally for newspapers, journals, books and postcards, while living in either Philadelphia or New York City. His jaunty signature, “Dwig,” appears on each of his creations.

Clare Dwiggins’ first postcard designs for Tuck were published in 1903.

His most memorable creation was “School Days,” a cartoon strip of the early 1910s, which flaringly depicted shenanigans of Victorian children.

Tuck entitled this card, “Don’t Chew the [Rag] to Pieces With Your False Teeth. Cut It Out!” Post cards in this series were called “Witty and Wise Knocks.” (At the turn of the century, one who “knocks” was a person one who makes harsh, ill-natured, undeserved criticisms of others). They typically contain double-entendre. The center of the card shows a frayed tablecloth with two large holes, looking more like an old worn rag than what it used to be. In the Random House Historical Dictionary of American Slang (1994), “chewing the rag” is defined as the nagging, quarrelsome and fault-finding chatter of a disagreeable and over-talkative person. This phrase is also associated with gossiping, grumbling, resuscitating old grievances, sulking, complaining, arguing and speaking irresponsibly and endlessly, without any hope of a definite agreement. The reference to false teeth may represent the utterance of false words or “hearsay.” The illustration on this postcard may even mean that one should not argue or talk frivolously at the dinner table.

This card, labeled “Tuck’s Postcard” on the address side, was sent to Mr. Reed Sparling, 108 Victory Avenue, Schenectady, New York. Postmarked December 10, 1909, 5 PM, it bears a green one-cent U.S. stamp (Franklin, Scott #A 138, issued in 1908-1909) affixed on a slant to the upper right corner. On the upper left corner, the British Royal Seal appears with the following identifying words, “ART PUBLISHERS TO THEIR MAJESTIES THE KING & QUEEN.” The inked personal message reads: “Hello Reed, Well how does city life agree with that country boy. I suppose you are making things jingle down in that big city. J.H.M.” While the penmanship of the sender is halting and uneven, a few words are written with flourish. Perhaps the sender was an elderly person who once had great dexterity in penmanship, but who now finds writing to be a difficult and taxing endeavor.

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From the Archives: Vol. 5, Nos. 1 & 2

Volume V, No. 1 January 1957

BULLETIN OF THE HISTORY OF DENTISTRY

official monthly publication of
American Academy of the History of Dentistry

A CORRECTION AND REFLECTION

# Dr. Curt Proskauer has corrected the somewhat rash characterization of Rudolph Virchow as a Bavarian biologist. He has pointed out that Virchow was born in Pomerania and lived in Berlin at the time he wrote his famous Cellular Pathology. It was in the Bavarian city of Würzburg that Virchow, according to his biographer, first conceived the idea at the basis of his outstanding biological theory. This is hardly enough to justify calling him a Bavarian.

The error raises an interesting question with regard to the most significant way of locating any historical personage geographically and chronologically. Conventionally, personages are oriented by the dates of their birth and death, although it is obvious that the terminal dates of a man’s life are likely to be the least productive. On this basis, for instance, Prinz, in his Dental Chronology, places Dr. G. V. Black at the year of his birth, 1836, at a time earlier than all the important developments of dentistry which occurred during his lifetime and with which he was associated—before the discovery of nitrous oxide anesthesia, before the use of vulcanite for denture bases, and before the use of cohesive gold foil to which he contributed so much.

Villoughby D. Miller was claimed both by America and Germany. This country claimed him because he was born here and had his dental education at the University of Michigan. Germany claimed him because he did his important work on the etiology of caries in that country and wrote most of his contributions to the literature originally in the German language.

It is a serious question to which every historian must find an answer when and where persons and developments in an historical account are to be most significantly located.

DENVER DENTAL ASSOCIATION CELEBRATION

# The Denver Dental Association commemorated the 50th anniversary of its annual mid-winter program January 6-8. This year also marks the 60th anniversary of the establishment of the organization.

Three Denver organizations preceded the Denver Dental Association. An organization called the Rocky Mountain Dental Society was organized in Denver probably in the early 1870’s. The Denver Dental Club was founded September 22, 1893. A
third society known as the Denver Dental Society also existed, but no record of its history is available. The Denver Dental Club and Denver Dental Society combined to form the Denver Dental Association September 20, 1957.

The information above was derived from a typescript entitled A History of Dental Conditions in Colorado Compiled by the History Committee Colorado State Dental Association.

DENTAL CONDITIONS OF MEDIEVAL MAN

P/ An excellent article on the dental conditions of persons living in the late Middle Ages by Rainer Zuhrt appeared in Deutsche Zahn-, Mund- und Kieferheilkunde, 25:1-24 Nos. 1-2 under the title "Stomatologische Untersuchungen an spätmittelelterlichen Funden von Reckahn (12.-14. Jh.)." The article is divided into two parts, one dealing with caries and its sequelae, and the other with periodontal conditions and malpositions of teeth.

The author discusses briefly the interesting problem as to whether missing teeth were extracted or exfoliated. He thinks the question cannot be conclusively answered from roentgenograms, but argues that extraction of the teeth "at the beginning of infection" (while the teeth were firm) is unlikely because the border of the lingual alveolar plate is uninjured.

HISTORY OF THE ARTICULATOR


DENTISTRY IN SWEDEN


DENTAL HISTORY AT SETON HALL COLLEGE

P/ Dr. Milton B. Asbell, secretary of the A.A.H.D. has been appointed to the department of dental history, literature, and orientation of Seton Hall College of Medicine and Dentistry.

PROFESSIONAL ORIGINS IN LONDON

P/ Letters to the British Dental Journal by C. Bowdler Henry (101:319-350 Nov. 20, 1956); R. A. Cohen (101:436-437 Dec. 18, 1956); and J. Menzies Campbell (102:65 Jan. 15, 1957) are concerned with the question as to what was the first dental hospital and school in England.
ERRATUM

Willoughby D. Miller received an A.B. degree from the University of Michigan in 1875. He studied at the University of Edinburgh and the University of Berlin, 1876-1877. He studied at Pennsylvania College of Dental Surgery 1877-1878 and was graduated from the Dental Department of the University of Pennsylvania in 1879.

THE VALUE OF HISTORY

The following extract from Rudolf Virchow's "Standpoints In Scientific Medicine" (1877) translated by L. J. Rather and printed in entirety in Bulletin of the History of Medicine (30:537-543 Nov.-Dec. 1956) presents very clearly a claim often overlooked by persons who do not appreciate the value of historical study to the health sciences:

True, we were enemies of tradition, but time has justified us. We were not, however, such barbarians that we considered it justifiable, as many do today, to despise or even ignore tradition merely because it is tradition. On the contrary, we were convinced that only historical knowledge is genuine knowledge, that justice toward others is the only counter-weight to exaggerated self-esteem, and also that valuable lessons can be drawn from the study of error. We have not forgotten this. As different as that which we worked out was from tradition, yet it was our pride to bring it into connection with the verified part of the old science, and to seek out the sources lying behind us from which the newer point of view has taken origin.

He who has only once through his own efforts tried to trace back the long path trod by his predecessors, who has felt how clear and luminous his own knowledge becomes as he grows aware of the historical circumstances through which it has arisen and discovers the basis of the errors through which even genuine investigators have been misled, who has learned that a kernel of truth sticks in every error, will not place himself with those who despise historical studies. Admittedly, however, history which is satisfied by the parading forth of an array of fragmented and disconnected groups of sentences from all periods for the sake of appearing erudite, and without that genuine insight into the significance of what is said available only in the light of its time with a full understanding of the scientific presuppositions then considered valid, amounts to nothing. We older ones know from our own painful experience well enough how to appreciate this difference, since we are only too well able to estimate the sort of
nonsense that can be ascribed to a man of an earlier era when someone plucks out a few scattered statements and tests his newly acquired wisdom on them.

PURKYNE AND DENTAL SCIENCE

The Bulletin of the Cleveland Medical Library for January is largely given over to the career of the Czech scientist Jan Evangelista Purkyne (1787-1869) as epitomized by Henry J. John.

In the long list of important discoveries in biological science, Purkyne's important contributions to odontology and especially dental histology and embryology might be overlooked. In 1828 Purkyne introduced the method of producing ground sections of teeth for study. With the development of the microscope into a practicable instrument of investigation about 1835, Purkyne, through his two students Rashkow and Fraenkel, developed the embryology of the teeth and the histology of tooth tissues.

The first microscopic demonstration of the existence of cementum on human teeth was made by Fraenkel, and the first illustration of the location of cementum appeared in his thesis.

From the time of Malpighi, the existence of cementum on the teeth of animals was known. Tenon in the middle of the eighteenth century described it in horses' teeth, and Blake about 1800 studied it in the complex molars of elephants. Cuvier coined the term ciment to designate it.

At the beginning of the nineteenth century, some anatomist began to suspect that the same tissue existed, occasionally and perhaps as a pathological manifestation, on human teeth. It was a German dentist, Ringelmann, however, who through his macroscopic observation, in 1824, first gave full recognition to cementum as a normal constituent of tooth structure. It remained for Purkyne, through his pupils, to give histologic proof of the third hard tissue of the teeth.

DEATH OF DR. F. C. WAITE

Frederick Clayton Waite (1870-1956) who was elected to honorary membership in A.A.H.D. in 1954, died March 30, 1956. He had a Ph.D. degree from Harvard University and was an active member of the faculty of Western Reserve University from 1906 to 1940.

Dr. Waite was author of several historical studies, especially of the health professions. He wrote a series of articles on the history of American dentistry, in the American Dental Surgeon for 1929, in which he advanced the thesis that American dentistry during the nineteenth century gradually separated from medicine of which it had been an integral part.
150 Years of the American Dental Association
Published by the American Dental Association
color, hardcover, 200 pages

For 15 generations, the American Dental Association has been recognized as the world’s largest and oldest national association within the profession. This new 200-page, full-color hardcover book explores the rich 150-year history of the ADA. The text and rare photographs offer a valuable resource for the dental historian and the dentist’s personal library. Additionally, it may offer an interesting read for patients in the reception room. Its 300 historical photographs, many of which are especially intriguing, were principally taken from the archives of the ADA.

The impressive Appendix lists every ADA annual session site, all former presidents, secretaries, executive directors and other notables of the organization.

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Tom Brown: Victorian Middlesbrough Dentist
by Dr. Anthony Brown

This biography combines “family, dental, social and local history” in telling the story of Tom Brown’s determination and ingenuity in achieving professional and economic success in the late 19th century. The inclusion of numerous images (photographed, developed and printed by Tom Brown himself), and annotations blended throughout provide additional insight into the subject’s social and cultural milieu. In addition, the author has been able to accurately describe dental practice during this period, with its emphasis on the so-called “mechanical dentistry” provided by dentists prior to the expansion and integration of the commercial dental laboratory system in the twentieth century.

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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

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. However, Der Zahnstocher und Seine Geschichte eine kulturgeschichtlich-kunstgerbliche studie (The Toothpick and its History: A cultural-historical and arts and crafts study) remains the premier reference resource. We must congratulate Dr. Potashnick for the time, effort and cost in providing this English translation.

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A Guide to Bone Toothbrushes of the 19th and Early 20th Centuries

by Dr. Barbara E. Mattick

While this book’s primary audience is archeologists, the subject of toothbrushes is intimately connected to our profession. A valuable reference source has been provided to those with an interest in collecting bone toothbrushes, and for anyone with an interest in dental history. Dr. Mattick has assembled, in a useable and well-visualized monograph, essential information for identifying such material.

The basis of this book is derived from research for her master’s thesis in anthropology, which proved that “bone toothbrushes are excellent dating tools for historical archaeologists.”

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**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.

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**Intriguing and Eccentric Characters & Stories from the World of Dentistry**
by Arden G. Christen, DDS, MSD, MA
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**Limericks With A Smile:**
Dental, Oral and Facial Limericks of Yesterday and Today
by Joan A. Christen, BGS, MA
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**A Little Treatise on the Teeth:**
The First Authoritative Book on Dentistry (1563)
by Bartholomaeus Eustachius
Edited by David A. Chernin, DMD, MLS
& Gerald Shklar, DDS, MS

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. His conceptual advances concerning tooth development and function 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. Eustachius’ observations are an illuminating precursor to 21st-century medical science, and still represent a timely and relevant reference for any practicing dentist.

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Flower of Remedies Against the Toothache
by M. Arnauld Gilles, Operator for the Aches of the Teeth

The first French text on dentistry and the diseases of the teeth. This work was published in 1621, more than 100 years before Pierre Fauchard’s classic work Le Chirurgien Dentiste. Re-discovered by Dr. Jacques R. Foure, who translated the work into English, he has provided us with an insight into the clinical treatments that were available in early 17th century France. M. Arnauld Gilles was a Parisian dental practitioner who was fully recognized by the state licensing authorities as “Operator for the Ache in the Teeth.”

The printing of the book has the left-hand pages as an exact facsimile of the original French text, with the English translation on the right facing page.

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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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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.

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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). http://www.bordeninstitute.army.mil
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If other than English abbreviations are used, they must be defined with first use: i.e., American College of Dentists (ACD).

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