

Anterior supernumerary teeth — assessment and surgical intervention in children

Robert E. Primosch, DDS, MS

Abstract

The purpose of this paper was to present various guidelines in the diagnostic assessment and surgical management of anterior supernumerary teeth in children. Early detection and prudent management of these teeth was considered essential in reducing disturbances in the eruption and position of the adjacent permanent incisors. It was recommended that immediate surgical removal be performed unless the supernumerary tooth was diagnosed as a non-inverted conical type or placed above the apices of the adjacent permanent teeth. If sufficient arch space was provided but the permanent incisor failed to erupt on its own accord, surgical exposure was then indicated for the unerupted crown. Finally, orthodontic traction was recommended only if spontaneous eruption did not occur within a short period of observation following crown exposure.

Introduction

The presence of supernumerary teeth in the premaxillary region often poses unique diagnostic and managerial concerns for the practitioner. Supernumerary teeth, or hyperdontia, is defined as an excess number of teeth when compared to the normal dental formula. Rarely is the surplus number compensated by an absence or deficiency of other teeth. Therefore, the dysfunctional nature of supernumerary teeth and their ability to create a variety of pathological disturbances in the normal eruption and position of adjacent teeth warrants their early detection and prudent management.

Historical reviews of the early dental literature provide an abundance of descriptive data on hyperdontia as well as theoretical proposals as to its developmental origin.^{1,3} Although many clinical case reports can be found in the literature, investigative studies are very

limited due to the lack of abundant clinical material. Without sufficient data, the practitioner is torn between opposing viewpoints as to when and how the problem of anterior supernumerary teeth should be confronted, and the risks and complications that intervention, or lack of it, may create. This paper will review the current literature regarding the diagnostic assessment and surgical management of anterior supernumerary teeth to provide a concensus of opinion as to the most reasonable and practical approach to this very interesting, but sometimes perplexing, clinical entity.

Prevalence

The prevalence of hyperdontia in the general Caucasian population ranges between 1-3%^{2,4,7} and appears, evolutionarily, to be on the increase.⁸ Approximately 90-98% of all supernumeraries occur in the maxilla with a particularly strong predilection (90%) for the premaxilla.^{2,4,7,9,10} The most common type of supernumerary is the mesiodens. It is located between the central incisors and has a 0.15-1.90% prevalence in the Caucasian population.^{4,11,12}

The occurrence of supernumerary teeth in the primary dentition is a less prevalent finding with a 0.3-0.6% occurrence.^{13,14} The probability of occurrence is five times less in the primary dentition than in the permanent dentition.^{11,14} The vast majority of primary supernumerary teeth are of the supplemental type, affecting lateral incisors, and rarely remain unerupted.^{2,15} Normal eruption is obtained because of the developmental spacing found in most primary dentitions.³ The lack of disruption in the arch form often allows its presence to remain undetected (Figure 1). The lower prevalence of supernumerary teeth in the primary dentition may partially reflect the difficulty in differentiating between gemination and fusion of a normal tooth with a supernumerary (Figure 2).^{5,8,16} This is supported by the fact that, unlike hyperdontia, the anomalies of fusion and gemination occur more fre-

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Figure 1. The supplemental lateral incisor in the primary dentition may remain undetected because the presence of developmental spacing allows for an uneventful eruption (A — clinical, B — radiograph).



Figure 2. The difficulty encountered in differentiating gemination of an incisor from fusion of a normal incisor with a supernumerary tooth may account for, to some degree, the reported lower prevalence of supernumerary teeth in primary dentitions (A — clinical, B — radiograph).



quently in the primary rather than the permanent dentition.⁸

The occurrence of supernumerary teeth in both the primary and permanent dentitions of the same child has been frequently reported and is likely to occur in approximately one-third of the cases.^{3,11,13-15} It will most often involve supplemental rather than rudimentary forms and lateral rather than central incisors.

Morphologic Types

Supernumerary primary teeth exhibit less variety in shape than supernumerary permanent teeth.³ Most supernumerary primary teeth are either midline mesiodens or supplemental lateral incisors.^{2,13}

Because the shape of supernumerary teeth in the anterior permanent dentition varies, several descriptive classification systems have been proposed.¹⁷⁻¹⁹ Generally, hyperdontia may be divided into two types according to shape: supplemental and rudimentary. Supplemental refers to eumorphic supernumerary

teeth of normal shape and size and may also be termed incisiform. Rudimentary defines dysmorphic teeth of abnormal shape and smaller size.

Rudimentary forms include conical, tuberculate and molariform types. Conical-shaped supernumerary teeth are the most common and occur as single, midline (mesiodens) or bilateral (mesiodentes) structures (Figure 3).^{19,20} Inversion of conical-shaped supernumerary teeth is not uncommon (Figure 4); however, the reported range of prevalence (24-75%) is very wide.^{2,9,19,22} The tuberculate type has a barrel-shaped appearance (width is equal to its length) and a crown anatomy consisting of multiple tubercles (Figure 5). Unlike conical-shaped teeth which have complete root formation, tuberculate types have either incomplete (stunted), or total absence of, root formation. Also, they are generally larger in size than the conical type. Finally, the molariform type has been only rarely reported.²³ This type derived its name because the crown closely resembles the morphology of a premolar.²⁴ It is unique in that it appears to occur in pairs in the central incisor area and, unlike the tuberculate, has complete root formation (Figure 6).

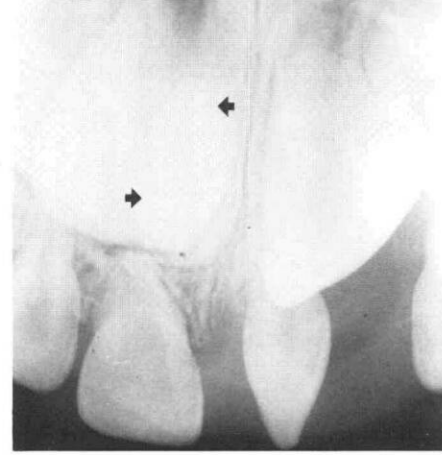
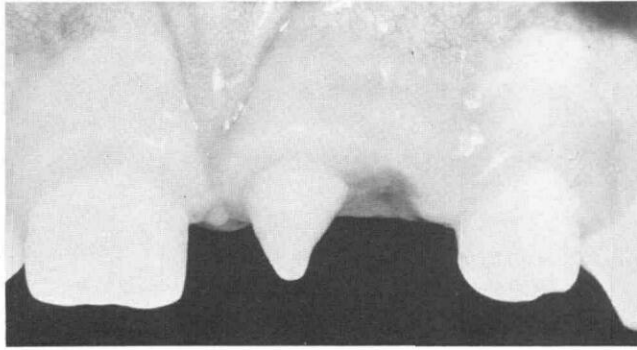


Figure 3. Conical-shaped supernumerary teeth are smaller than normal size, occur near the midline, have the potential for complete root formation and often erupt. The eruption of this mesiodens has caused premature exfoliation of the left primary central incisor.

Note the unerupted inverted mesiodens superimposed upon the right permanent central incisor on the radiograph (A — clinical, B — radiograph).

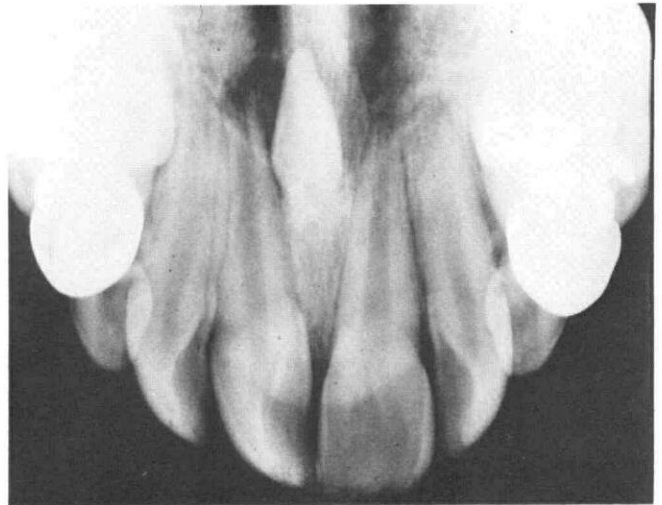


Figure 4. Inverted conical-shaped supernumerary teeth are not uncommon. The presence of this tooth has created displacement and rotation of the right permanent central incisor (A — clinical, B — radiograph).

Location

Single (midline or unilateral) development is the most common, but multiple, bilateral occurrence can occur in approximately 13% of the subjects examined,^{17,21} with higher frequency if only central incisors are included.¹⁹ Conically-shaped supernumerary teeth are found most commonly as isolated, single cases, whereas bilateral cases have a predominance of tuberculate-shaped teeth.¹⁷

Conical types are generally located between the central incisors, but may occasionally be found in a palatal position as the surrounding dentition develops in a forward and downward direction. Rarely, these supernumerary teeth can be found in a labial position to the adjacent teeth, especially if they are of the inverted conical form. The usual mesial position of conically-shaped teeth inspired Di Biase to term them "mesiodonts."¹⁷ Because of their shape and position, mesiodonts often erupt, only rarely delaying the eruption of other teeth (Figures 3 and 7).

On the other hand, tuberculate-shaped supernumerary teeth rarely erupt and often delay eruption of the adjacent teeth (Figure 5).^{17,19} Their usual palatal

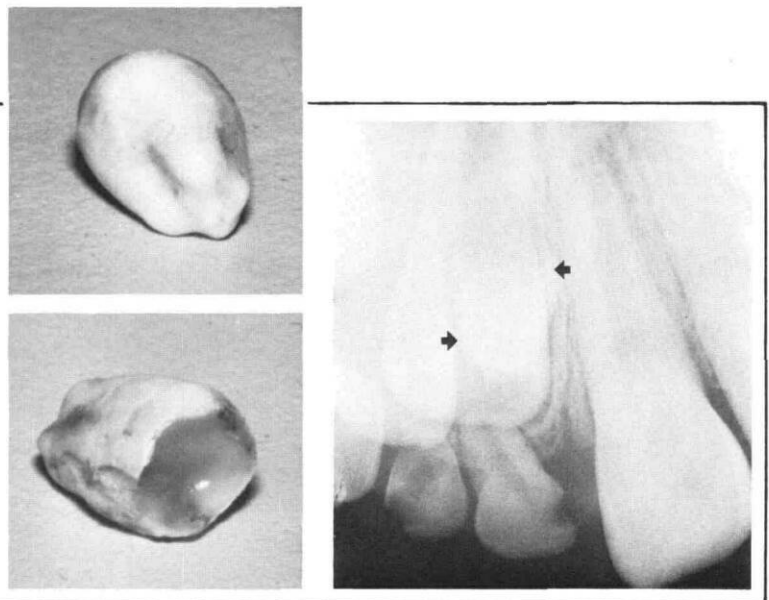
position to the incisors has influenced Di Biase to call them "palatodonts."¹⁷ Their close proximity to the incisors, and the narrow width of the alveolus in the premaxilla, greatly enhances the palatodont's ability to cause labial displacement.²⁵ A summary of these features may be found in Table 1.

During the early mixed dentition, a large percentage of anterior supernumerary teeth are unerupted (range = 79-91%).^{2,20,21} However, it appears that the prevalence is reduced with age as only 42-51% of the supernumerary teeth were found unerupted in slightly older (adolescent) populations.^{6,17} The higher prevalence of unerupted supernumerary teeth in younger age groups may suggest some transient delay in eruption.¹⁷

Origin and Inheritance

The etiology of hyperdontia is unknown. Originally, it was proposed that hyperdontia was the result of phylogenetic reversion (atavism) to extinct primates with three pairs of incisors.^{26,27} However, this theory is largely discounted. A second theory proposed that hyperdontia was created by a split in the tooth bud (dichotomy theory). A complete, equal split

Figure 5. Tuberculate-shaped supernumerary teeth develop in varying sizes. This example demonstrates the multiple tubercle formation on the crown and the absence of root formation. Because of their palatal location and lack of eruption, the tuberculate types are largely responsible for retarded eruption or impaction of the permanent central incisors (A — clinical, B — radiograph).



of the bud would then result in two supplemental forms (twinning), whereas an unequal split would result in one normal tooth and one diminutive form. The dichotomy theory holds some appeal because a similar but incomplete process called gemination likewise occurs most frequently in the premaxilla.¹⁴ A third theory states that hyperdontia results from independent, locally conditioned hyperactivity of the dental lamina. According to this theory, the supplemental form would come from the lingual extension of

an accessory tooth bud, whereas the rudimentary form would be derived from the proliferation of epithelial remnants of the dental lamina. These supernumerary teeth could develop concurrently with the natural teeth and have complete root formation (conical type) or develop later with incomplete root formation (tuberculate type). The late development of the tuberculate type has encouraged the use of the term "third dentition teeth" to describe them.¹⁷ Although all theories are hypothetical because of the inability to obtain sufficient embryologic material on the origin of hyperdontia, most literature supports the dental lamina hyperactivity theory.^{11,17,24,26}

Likewise, little is known concerning the modes of inheritance or genetic influence on supernumerary dental development. Although Sedano and Gorlin suggest that hyperdontia might follow an autosomal dominant inheritance with lack of penetrance, there is little supportive evidence.¹² The sex predilection for its occurrence, favoring males over females (2:1),^{4,6,7,9,19} has influenced one author to suggest a possible sex-linked inheritance.²⁸ A familial tendency has been demonstrated in 10 out of 23 cases²¹ but further research is warranted. In addition, there are several systemic disturbances, such as craniofacial dysostosis (oral-facial-

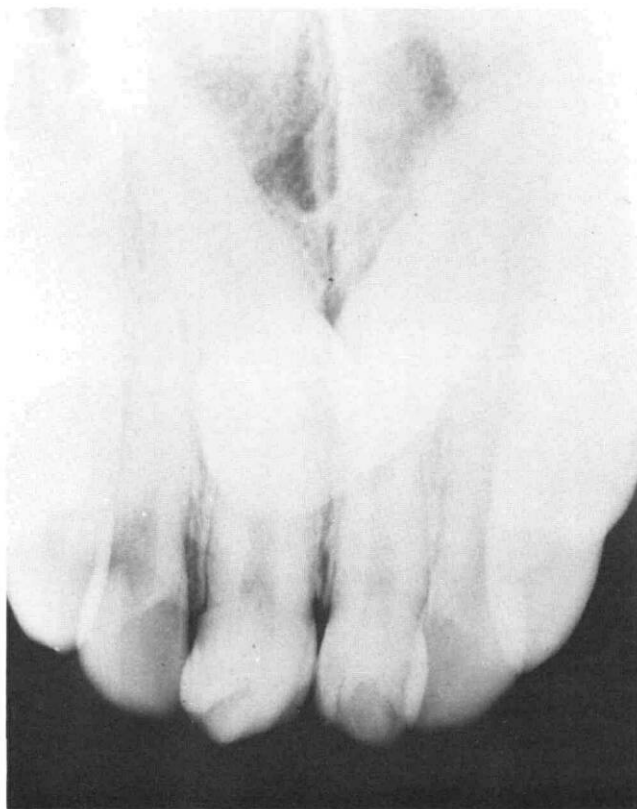


Figure 6. Molariform types are extremely rare. Their unique characteristics include morphologic resemblance to a premolar, bilateral occurrence, and complete root formation.

Table 1. Generalized features of anterior supernumerary teeth according to location.¹⁷

Features	Mesiodont	Palatodont
Shape	Conical	Tuberculate
Size	Smaller	Larger
Root Formation	Complete	Incomplete
Position	Single	Multiple
	Midline	Bilateral
	Erupted	Unerupted
Adjacent Eruption	Normal/Delay	Delay/Failure

Figure 7. Eruption of a mesiodens may create early exfoliation of primary teeth, but rarely interferes with the eruption potential of the permanent teeth. Delay in surgical removal until after eruption is a more prudent, less traumatic approach to its management.

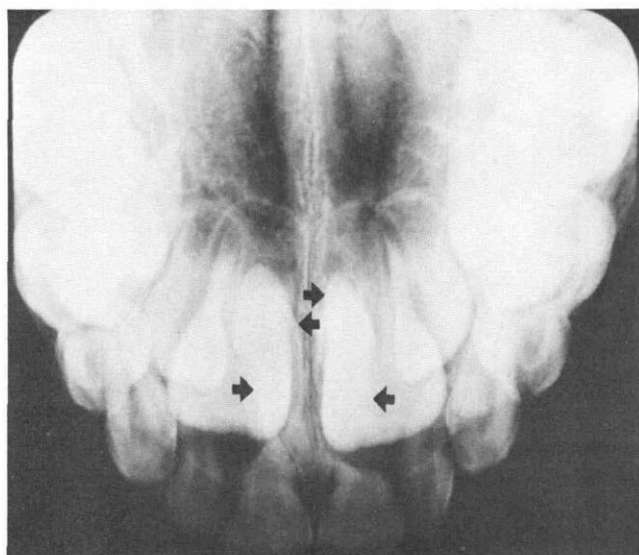


Figure 8. Bilateral, inverted mesiodentes in this patient may be overlooked if not closely examined, because of their superimposition upon the permanent central incisors.

digital syndrome), cleidocranial dysostosis, and Gardner syndrome, which have been reported to demonstrate a higher prevalence of supernumerary dental formation.

Diagnosis and Assessment

Radiographic recognition is not a significant problem but care must be taken to avoid misinterpretation of superimposed landmarks which simulate or mask supernumerary teeth (Figure 8). Localization of unerupted supernumerary teeth through determination of their spacial relationships is especially important if surgical intervention is required. This can be accomplished by the use of one of several radiographic methods.

A common technique employs a stereoscopic approach using two radiographs of the same area but with different angulations.²⁹ This method utilizes the theory of parallax³⁰ to locate the spacial relationship of an object and is commonly referred to as Clark's rule. By comparing the changes in proximity of the supernumerary tooth to some adjacent landmark on succes-

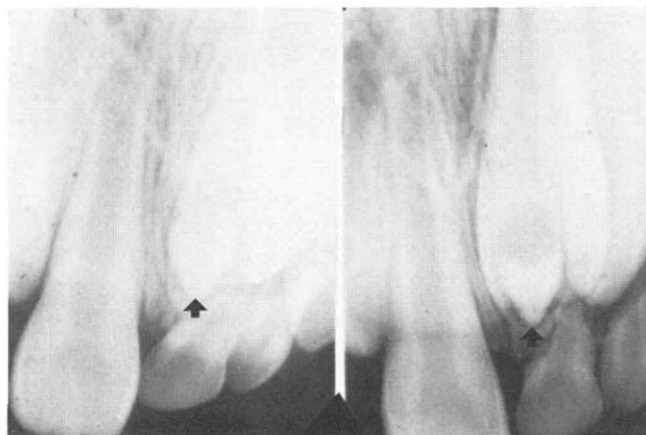


Figure 9. Labiolingual localization technique can be employed by using the parallax theory. As the radiation source is moved from left to right, the tuberculate appears to shift in the same direction when compared to adjacent landmarks. Using the SLOB rule, it can be assumed that the tuberculate is located in a palatal position.

sive films of different angulation, the labio-lingual position of the tooth relative to the landmarks chosen can be interpreted.³¹ For example, when shifting the horizontal (lateral) angulation of the beam but maintaining the same vertical direction, the buccally located object will move on the second film in the same direction as the shift. This phenomenon is referred to as the buccal object rule.²⁹

However, a less confusing approach evaluates the direction of the source of radiation rather than the beam. In this case, the lingual object will appear to move in the same directional shift as the tube head (cone), whereas the buccal object will move in the opposite direction. The relationship of the observed object to the movement of the source of radiation is often referred to as the S.L.O.B. rule (Same on the Lingual, Opposite on the Buccal).²⁹ This rule may be easier for the clinician to remember since most supernumerary teeth are located in a lingual position (Figure 9).

If a panorex is available, further exposure to the patient will be unnecessary because the midline shift of the beam provides two views of the anterior region

which are suitable for comparison.^{29,32} Prior knowledge of the direction of tube movement is not necessary. As the observer scans the panorex from one side to the other, the object's location may be determined using the S.L.O.B. rule.

There are other alternative means of localization. The right angle (cross-sectional) technic is a true occlusal view taken at 90° vertical angulation rather than 65° angle as with standard occlusal method.²⁹ However, to determine the labiolingual position of the supernumerary tooth without superimposition upon adjacent roots, a vertex occlusal view which passes through the long axis of the teeth should be taken. This method may be more precise but requires greater radiation exposure.^{1,33} Although these views are different, they are often thought of as the same.²⁵

Another alternative method of labiolingual localization and true vertical position is the lateral projection.^{29,34} The only obstacle encountered in this technique is the difficulty in securing adequate detail.³¹ A lateral projection may be easily accomplished by directing the beam at a right angle to an occlusal film placed parallel to the midsagittal plane of the head (Figure 10).

The relatively high prevalence of anterior supernumerary teeth in the primary and early mixed dentitions of children justifies the mandatory inclusion of a maxillary occlusal view for screening children of this age.²⁰ In fact, in children ages 6-9 years, 61% of all dental anomalies would go undetected if only bitewing radiographs were taken.³⁵ In addition, the presence of gemination/fusion of the primary incisors³⁶ or the obvious delayed eruption of permanent incisors should stimulate further radiographic examination for supernumerary teeth. Early recognition will allow for more comprehensive longterm planning and, frequently, less extensive intervention.

Complications

Using cross-sectional data, the presence of a supernumerary tooth will be an innocent finding without associated pathology in 7-20% of the cases surveyed.^{1,38} Therefore, the vast majority of these teeth will create some clinical complication. The complications most often associated with the tooth itself are nasal eruption and cystic degeneration. Eruption of supernumerary teeth into the nasal cavity occurs rarely. Several case reports are available which indicate that the inverted conical type is the most common offender.^{22,37,38} Dentigerous (follicular) cyst formation is another problem associated with unerupted supernumerary teeth.^{27,39} Although the follicular sac is enlarged in 30% of the cases,⁴⁰ only 4-9% have actual histological evidence of cystic formation.^{17,22,36,40}

Most problems associated with supernumerary teeth are due to their ability to interfere with normal

eruption and position of the adjacent teeth. These problems include loss of vitality, diastema formation, displacement and impaction.

In reviewing the literature, only one case has been reported showing evidence of rapid root resorption caused by the presence of a supernumerary tooth.⁴¹ However, there was also a prior history of trauma to that resorbing tooth which might have been a contributing factor. Another report has cited an apically placed supernumerary tooth as the causative factor in the central incisor's loss of vitality.³³ Since only a few reports exist concerning the effect of a supernumerary tooth on the vitality of adjacent teeth, the actual cause and effect relationship cannot be firmly established.

Likewise, the creation of midline diastema by supernumerary teeth is often cited as a complication, but rarely observed. The simultaneous occurrence of the two conditions is actually extremely rare,⁴² although several case reports are available²⁸ and the prevalence has been reported to be as high as 15%.³⁸

The most common and deleterious effect of supernumerary teeth is their ability to interfere with normal occlusal development. The interference can result in unerupted/impacted or displaced teeth, creating a very unesthetic situation and grave parental concerns. Displacement of the adjacent teeth can occur in 22-63% of the cases.^{1,36} Eighty-two percent (82%) of the involved teeth will be displaced into a labial position.⁴³ Reports have indicated that even in those cases where the unerupted incisors were severely rotated (Figure 11), early removal of the offending supernumerary tooth resulted in self-correction and proper alignment.^{27,34,44}

The ability of a supernumerary tooth to interfere with the normal eruption process can also lead to retarded eruption or impaction of the incisors (Figures



Figure 10. In order to locate the labiolingual position of the tuberculate, a lateral projection using an occlusal film placed parallel to the midsagittal plane of the head may be taken.



Figure 11. Early removal of this inverted mesiodens will result in self-correction of the severely rotated unerupted permanent central incisor.

5, 9, and 11). The difference between unerupted and impacted teeth should be understood as being one of clinically separate entities.⁴⁵ Disruption in the normal eruptive pattern will occur in 30-60% of the cases,^{1,6,9,17,18,34,36,43,46} and poses the most serious complication that the clinician must manage, or preferably prevent. A summary of the complications created by the presence of supernumerary teeth according to prevalence and the most commonly associated tooth type is found in Table 2.

Removal

Without question, a supernumerary tooth is indicated for removal if any of the above listed complications are found during examination.^{26,47} However, much debate is concerned with the merit of prophylactic or preventive removal of such teeth when no apparent pathologic complication or adverse sequelae is present. Proponents of this philosophy argue that: 1) the likelihood of developing complications is real if left untreated; 2) the teeth serve little, if any, function; and 3) the prognosis of surgical intervention is good (recurrence is extremely rare).²⁶

The option to intervene surgically must be tempered by the conditions present. A more conservative approach of observation is advised if the supernumerary tooth develops simultaneously with the primary dentition. Supernumerary teeth in the primary dentition have less effect upon adjacent teeth than they do in the permanent dentition because the developmental spacing can accommodate an extra tooth without producing an irregularity, and will probably erupt and exfoliate without being noticed (Figure 1).³ Likewise, some mesiodens will erupt early, causing premature exfoliation of primary incisors (Figures 3 and 7). A prudent delay in their surgical removal until after clinical eruption provides an easier, less traumatic ap-

proach.^{44,46} On the other hand, some supernumerary teeth, such as the inverted conical form or the tuberculate, will never erupt and must be surgically removed.

Timing of Removal

The timing of the surgical removal of supernumerary teeth is highly controversial. There are two schools of thought as to the optimal time for surgical intervention: immediate *versus* delayed. Immediate intervention denotes removal within a short period of time following initial diagnosis: it is synonymous with early removal, assuming that the child is seen for initial examination before six years of age. On the other hand, delayed intervention denotes observation until adjacent root formation is complete, generally between eight and ten years of age.

The disadvantages of immediate intervention are: 1) potential damage to adjacent teeth resulting in devitalization and/or root malformation, 2) inability of a young child to psychologically tolerate the surgical procedure, and 3) the performance of unnecessary surgery if future complications fail to develop. On the other hand, delayed intervention until the lateral incisors have erupted may increase the risk for: 1) loss of eruption potential of the central incisors, 2) loss of anterior arch space or midline shift, and 3) more extensive surgical and orthodontic treatment for correction. Obviously, if the supernumerary tooth is located beyond the apex or has erupted, the timing of intervention is not as critical.

The fact that the potential risks with either approach are difficult to weigh has led to some very contradictory advice in the literature. For example, Thoma states: "The removal of a mesiodens should be undertaken as soon as possible to prevent secondary displacement of adjacent teeth. Unless the mesiodens interferes with normal eruption, the best time to remove it is after the roots of the permanent teeth have completely formed to avoid injury to the developing permanent teeth."²⁷ Furthermore, Stafne recom-

Table 2. Summary of the complications created by the presence of supernumerary teeth according to prevalence and the commonly associated tooth type.

Complications	Prevalence	Tooth Type
Retarded Eruption	30-60%	Tuberculate
Displacement	22-63%	Tuberculate
Dentigerous Cyst	4-9%	Inverted Conical
Diastema	Rare	Conical
Nasal Eruption	Rare	Inverted Conical
Root Resorption/ Loss Vitality	Rare	—

mends that "removal of those teeth (supernumeraries) at an early age may be a means of avoiding the majority of cases of delayed eruption, . . . and malposition of permanent teeth. (However) When one considers the difficulty of removal and the possibility of injury to the permanent teeth, a conservative attitude toward the teeth in question undoubtedly is justified."²² Quite obviously, the clinician cannot hope to prevent major complications, such as eruption disturbances, if treatment is delayed until completion of root formation.

Although evidence in the literature is difficult to find, the greatest fear of early intervention is the risk of possible damage to the formation of the adjacent teeth. Because of this concern, many authors recommend delayed intervention.^{18,27,33,36,47,48} Others feel strongly that supernumeraries should be removed immediately.^{24,49}

In support of the preventive approach, Rotberg and Kopel recommend supernumerary removal when first radiographically identified, regardless of age.⁴⁹ In a longitudinal study of 375 cases, they concluded that immediate removal (before five years of age) was superior to delayed removal (after seven years of age), since the prevalence of future complications such as displacement and retarded eruption was reduced by 39%, and additional surgical/orthodontic treatment by 45%. In addition, they indicated that there is less palatal bone loss when surgery is performed before five years of age, and that excessive concern for the psychological impact of early surgery on a young child is unwarranted.

Di Biase recommends the following compromised approach to the timing of surgical intervention based on tooth type and stage of eruption.⁴⁰ Conical-shaped forms, especially midline types, should be observed for early eruption unless creating complications (Figures 3 and 7). Tuberculate and inverted conical forms, which do not erupt, but more frequently create complications, should be removed immediately if causing adjacent central incisors to remain unerupted. Immediate removal to induce spontaneous eruption is desirable before eruption of the lateral incisors can cause arch space loss. If the central incisors are erupted and displaced, then removal should be delayed until after the laterals erupt, when the crowding can be effectively relieved by appliance therapy. There is no indication that delay in this situation will worsen the degree of incisor displacement. Foster and Taylor agree that the tooth type is critical in making the judgment when to surgically intervene.¹⁹ Also, the clinician should be aware that inverted conical types are harder to remove if delay allows them to migrate deeper into the alveolus.⁴⁷

The procedure for surgical removal of unerupted supernumerary teeth is well-described in the literature and is summarized in Figures 12-18.^{24,26,27,47}

Figure 12. These bilateral tuberculate-shaped supernumerary teeth have retarded the eruption of both permanent central incisors. Since the permanent lateral incisors are completely erupted, further delay in surgical intervention is unwarranted. A second radiograph must be taken to determine the labiolingual position of the supernumeraries.

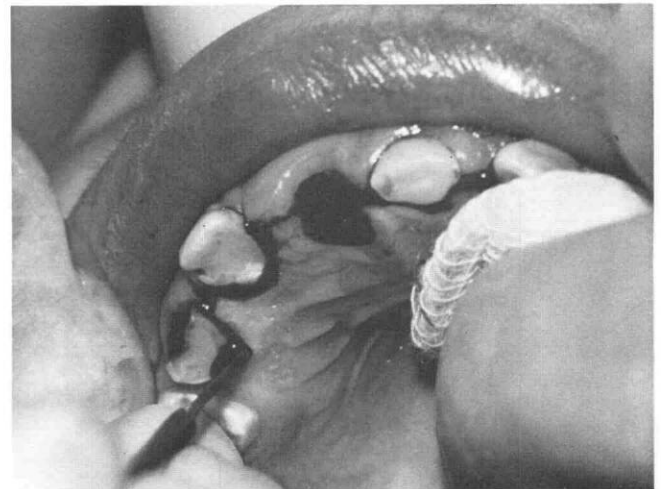
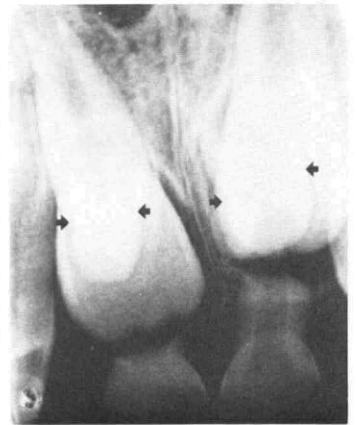


Figure 13. Since the supernumeraries were determined to be palatally located, a semicircular incision along the palatal gingival margin is made from canine to canine.

Surgical Exposure of Unerupted Incisors

For those incisors which have retarded eruption, as evidenced by lack of symmetrical development, the clinician should determine with confidence which incisors will erupt spontaneously, and which will require exposure after supernumerary tooth removal. Several studies show that the majority of unerupted teeth (approximately 75%) will erupt naturally once the supernumerary tooth is removed.^{18,34,50,51} Full eruption is likely to occur naturally within 1½ to 3 years.^{34,43,51} However, the majority of these incisors often erupt short (by about 1 mm) of the occlusal plane.^{18,50} This phenomenon has been attributed to the presence of a matured gingival fiber system.⁵⁰

The rate of natural eruption is influenced most by the height of apical displacement^{34,50,51} and the maintenance of sufficient arch space.⁴³ The patient's chronologic age, as well as the degree of root maturity, inclination, and curvature appear to have little influence on eruption rate.^{18,51,52} Nevertheless, contrary opinions do exist.^{34,43,50} A thickened follicle around the unerupted crown is also a likely barrier to eruption.^{50,53} Removal of the fibrous tissue overlying the crown will result in

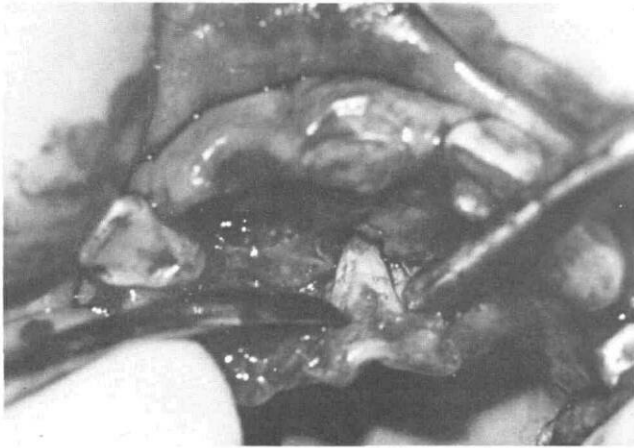


Figure 14. A full thickness mucoperiosteal flap is reflected. The nasopalatine structures can be severed without adverse effects.⁴⁷ If desired, the flap can be held in a retracted position by sutures looped around the molars.



Figure 16. The supernumerary is located and identified prior to extraction. The entire follicle should be removed to prevent recurrence or residual cyst formation.¹

rapid eruption in most cases.^{50,51,53} If surgical exposure is deemed necessary, the prognosis for spontaneous eruption is excellent (approximately 85%).⁵¹⁻⁵⁴

After the decision has been made to surgically expose an unerupted incisor, the operator must be aware of certain precautions. The unerupted crown must not be surgically exposed by merely creating a window in the overlying tissue. If the mucous membrane is removed above the mucogingival junction, the ultimate result will not produce a functional, physiologic and esthetic outcome. This technique will fail to provide sufficient attached keratinized gingival tissue cervical to the crown as it migrates toward the occlusal plane. In addition to the lack of sufficient attached tissue, an unesthetic, enlarged, festooned gingival cuff around an elongated clinical crown will occur.⁵⁰ To provide adequate attached tissue, an apically repositioned flap should be performed^{55,56} after adequate space is provided by a compressed open coil spring (Figure 19).

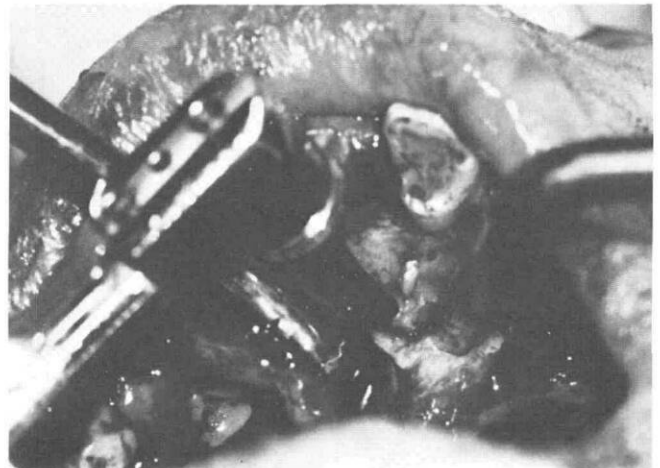


Figure 15. If necessary, the primary incisors as well as any overlying bone may be removed to locate the supernumerary tooth. Chisels are better for bone removal than burs because of less likelihood of damage to adjacent structures.²⁵ However, damage to adjacent structures rarely occurs if a conservative approach is used since the supernumerary lies in a different anatomic plane.

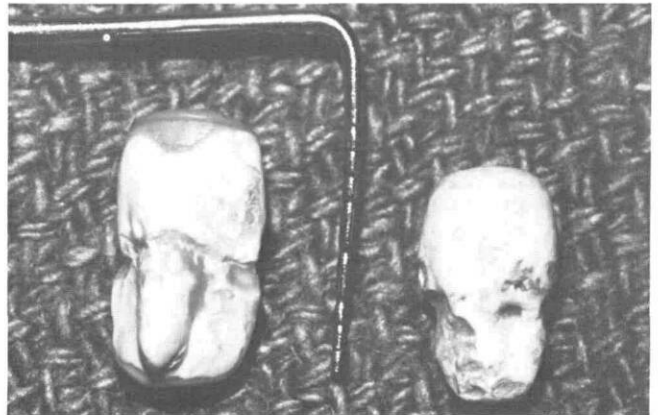


Figure 17. The two extracted tuberculates are shown here. Note the multiple tubercles on the crown and the stunted root formation.

For deeply placed unerupted incisors, placement of a pack will minimize scar construction and help augment spontaneous eruption.^{18,25,43,52}

The procedure for surgical exposure of unerupted permanent incisors is well defined and illustrated in Figures 20-23.^{55,56}

Recommendations for Treatment

If feasible, depending upon the urgency and severity of the situation, the following three-step approach to the management of supernumerary teeth in children is recommended.

First, surgical removal of the supernumerary tooth should occur immediately following recognition and localization of its position in order to reduce the risk of future complications. The exceptions to this rule are: 1) midline (non-inverted) conical-shaped teeth with excellent prognosis for uninhibited, early erup-



Figure 18. The flap is sutured back into place. An aspirating syringe may be used to relieve hematoma formation underneath the flap if it should occur as a sequela.³⁶

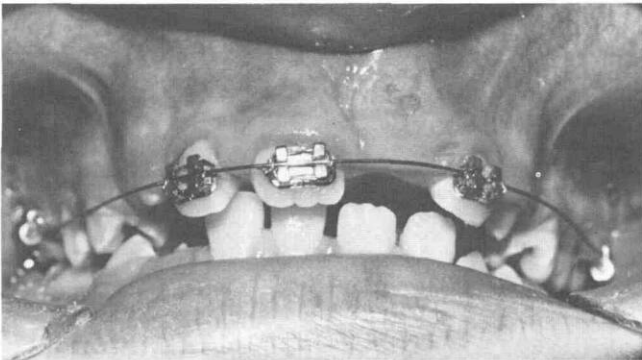


Figure 20. Adequate space for tooth eruption into proper arch alignment must be provided prior to surgery.

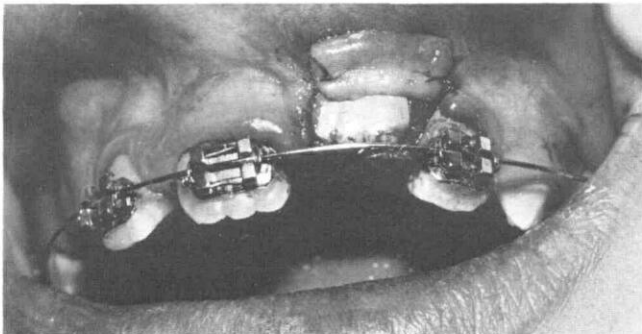


Figure 22. The mucoperiosteal flap is released vertically to uncover the crown surface. The apically positioned flap is sutured with 5-0 sutures at a minimum of 3 mm incisal to the CEJ of the exposed crown.

tion, and 2) the highly placed (above apices) tooth without evidence of associated complications.

Second, surgical exposure of the unerupted incisor crown should occur only if there is sufficient lack of eruptive movement following a reasonable period of observation (6 months)^{37,38,40} and enough arch space for eruption.

Third, orthodontic traction should be used to intervene in those cases not displaying spontaneous eruption after surgical crown exposure.

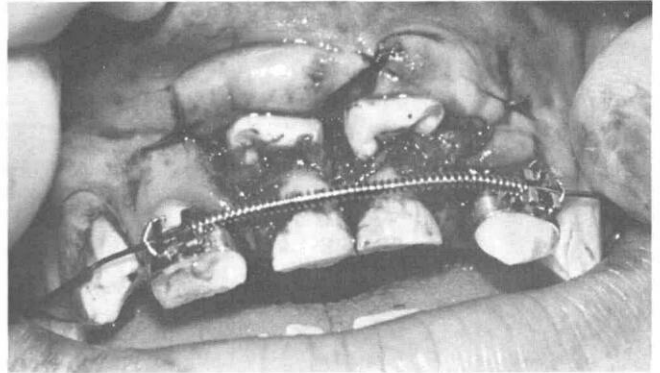


Figure 19. An apically repositioned flap to expose unerupted permanent central incisors, after adequate space is provided by a compressed open coil spring, provides sufficient keratinized attached tissue around the crowns before further eruption is allowed.

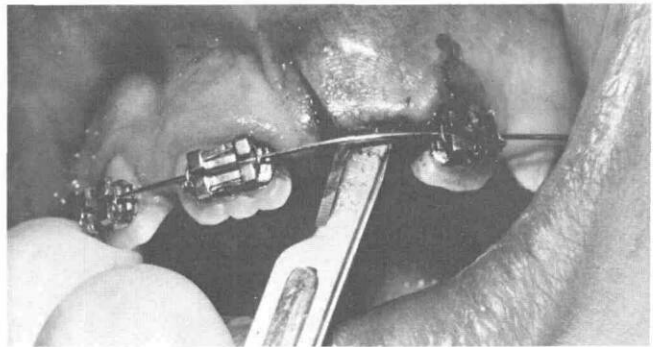


Figure 21. A horizontal incision over the edentulous space and two slightly converging vertical releasing incisions from the alveolar mucosa to the horizontal incision are made to allow the apical base of the flap to be wider in order to insure adequate blood supply to the flap.



Figure 23. If it is determined that orthodontic treatment is necessary to facilitate eruption, direct bonded brackets are recommended.⁵⁷ Traction mechanics similar to the double horizontal loop,⁵⁸ as illustrated, are recommended over traction chains.⁴⁵

Dr. Primosch is assistant professor of pedodontics, College of Dentistry, University of Oklahoma Health Science Center, 1001 Stanton L. Young Blvd., Oklahoma City, Oklahoma 73190. Requests for reprints should be sent to him at that address.

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Quotable Quotes

There have been a number of misunderstandings in the West about acupuncture. It has nothing to do with parapsychology, occult influences or "psychic powers", and consequently does not deserve the praises of those who believe in such things. It does not depend entirely on suggestion, nor on hypnotic phenomena at all, and it is not contradictory of modern scientific medicine; consequently it does not deserve the *odium theologicum* of the medical profession in the West. Acupuncture is simply a system of medical treatment which was already two thousand years old when modern science was born, and which had developed in a civilization quite different from that of Europe.

Today the explanation of its actions is being sought in terms of modern physiology and pathology; great advances have been made in this direction though the end is not yet in sight. It looks as though the physiology and biochemistry of the central and autonomic nervous systems will be the leading elements in our understanding, but many other systems, endocrinological and immunological, are also sure to be involved. Another problem of great interest is the exact nature of the acu-points in terms of histology and biophysics. Since modern science did not spontaneously grow up in Chinese culture, acupuncture is traditionally based on a theoretical system essentially medieval in character, though very sophisticated and subtle, indeed full of valuable insights and salutary lessons for modern scientific medicine. Again the exact reinterpretation and reformulation of these theories, if such a thing is possible, will be a difficult matter for the future. However, we think it likely that in the ecumenical medicine of the coming years there will be a definite place for acupuncture both in therapy and analgesia — exactly how far this will be so it is too early as yet to say.

From: Gwei-Djen, L., Needham, J.: "Pains and Needles," *New Scientist*, pp 860-863. September, 1980.

Quotable Quotes

The United States, having purportedly opted for metric conversion, is quietly backing out of the whole deal. And without any organized resistance.

The decline, hindsight reveals, began on the day of apparent triumph in 1975 when President Ford signed the Metric Conversion Act establishing a multi-million dollar U.S. Metric Board to "coordinate the voluntary conversion to the metric system."

Tricky word, "voluntary." It was stuck in the bill at the last minute by legislators who realized it would not otherwise pass and it has unhinged all the efforts of metricators since, because it forced metric to grow on its merits rather than by decree. Metric's merits for use in daily life were summarized by a lady (responding to the sudden appearance of kilometre road signs on her highways) who wrote to the U.S. government inquiring, "Have you gone completely crazy?" (The road signs came down.)

The question that remains is, why are governments and education systems such suckers for ideas like metric conversion and nuclear energy that sound terrific so long as you don't think about them for more than 30 seconds?

From Stewart Brand, "Stopping Metric Madness!", *New Scientist*, Vol. 88, October 30, 1980.