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Missing maxillary canine: from diagnosis to treatment

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ABSTRACT

When a maxillary canine has not appeared in the arch at its scheduled time of arrival, the treating dentist should make a precise analysis of the possible factors responsible for its absence and devise the best therapeutic plan for correcting the problem. Factors to be considered are its agenesis or the more likely possibility of anomalies of tooth size and eruption patterns. Deciding whether to bring an absent canine into place orthodontically or to replace it prosthetically or with an implant almost always constitutes a sort of therapeutic wager.

This article proposes a method for the systematic appraisal of the management of a missing maxillary canine using a decisional tree of the "in cases where" type. It allows for questionable issues to be grouped in logical order, starting with diagnostic procedures that lead to the beginning of a step-like therapeutic sequence that concludes, if it proves negative, with the development of an alternative to the initial treatment plan (fig. 1).

This arboreal schema is comprised of three parts:

1 – The first deals with diagnosis;

2 – The second takes up the start of treatment in consideration of the position of the tooth and the possibility of its being ankylosed or becoming ankylosed;

3 – The third is concerned with replacing the missing canine tooth in accordance with the dictates of implant or prosthetic therapy, or of an orthodontic solution to the problem.

KEYWORDS

Canine
Agenesis or congenital absence
Over-retention
Impaction
Ankylosis.

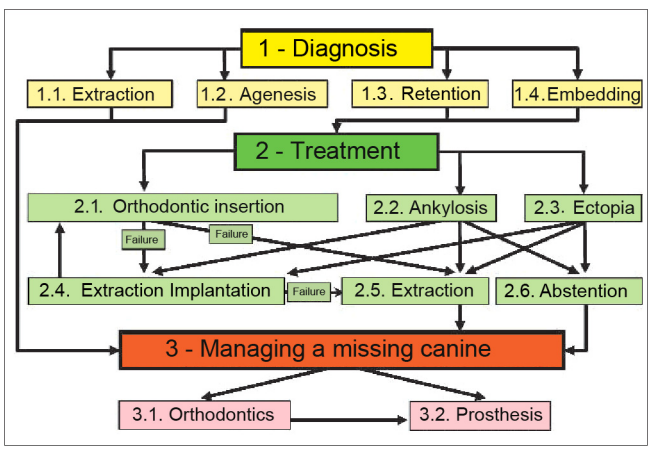

Figure 1
Decision tree for treatment of a missing canine.

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The absence of a canine in the dental arch beyond the age of normal eruption, points diagnostically towards four possible causes: recent or previous extraction of the tooth, agenesis of the canine, its over-retention or its impaction.

1 - EXTRACTION - AGENESIS

1 - 1 - Differential diagnoses

Although this course of action is rarely the best, orthodontists must ask themselves whether, especially for adults, they should simply extract an unerupted permanent canine rather than subject the patient to prolonged investigations and treatment procedures. At this stage, case histories and intake questionnaires are of prime importance. Patients and practitioners, will, of course, be spared from this surgical procedure if patients remember from their dental past that a previous dentist had already extracted a buccally or palatally placed ectopic canine because of major dental-maxillary disharmony. The present dentist can use a panoramic film to confirm or refute this hypothesis in any case.

Canine agenesis is quite unusual. It occurs less frequently in canines than in all other teeth. (Agenesis of 3rd molars is by far the greatest.) Canines rank 8th in the list of agenetic teeth with a frequency of 1.3% for maxillary canines and of 0.3% for mandibular canines (fig. 2). By analysing panoramic films orthodontists can make a near definitive diagnosis of their absence, except in the extremely rare instances of ectopic maxillary canines lying near the orbit, beyond the range of the panoramic film. To rule out this possibility, they can refer to the cephalometric profile film, which is, happily, a routine part of the orthodontic examination file.

Prevalence of dental agenesis	Maxillary		Mandible	
	Frequency	Rank	Frequency	Rank
Lateral incisor	22.90%	1	2.50%	5
Second premolar	21.20%	3	41.00%	1
Canine	1.30%	8	0.30%	11

Figure 2
Prevalence of maxillary canine agenesis.
Classified 8th with a frequency of 1.3%, maxillary canine agenesis is still exceptional. It does not display laterality but there is sexual dimorphism of 1.37 in favour of women.

1 - 2 - Treatment

(fig. 3 a to c)

To deal with a canine tooth missing because of agenesis or extraction, orthodontists and patients can choose from three possible treatment plans:

- In cases where four premolar will probably be extracted as a part of the treatment plan, the already missing canine can serve in place of a premolar, which can be moved orthodontically to take its position in the arch, providing the treatment team can adequately disguise it, by reshaping or other means, so that it can serve aesthetically and functionally as a canine:
  - in lateral guidance (with the palatal cusp of the first premolar acting as a canine cusp);
  - with orthodontic, prosthetic, and cosmetic dental skills making the

smaller bicuspid look like the missing more bulky canine;

- In some cases of missing canines, where the available space is adequate and where the axial inclination of the adjacent teeth is acceptable, treating practitioners may place prosthetic or implant

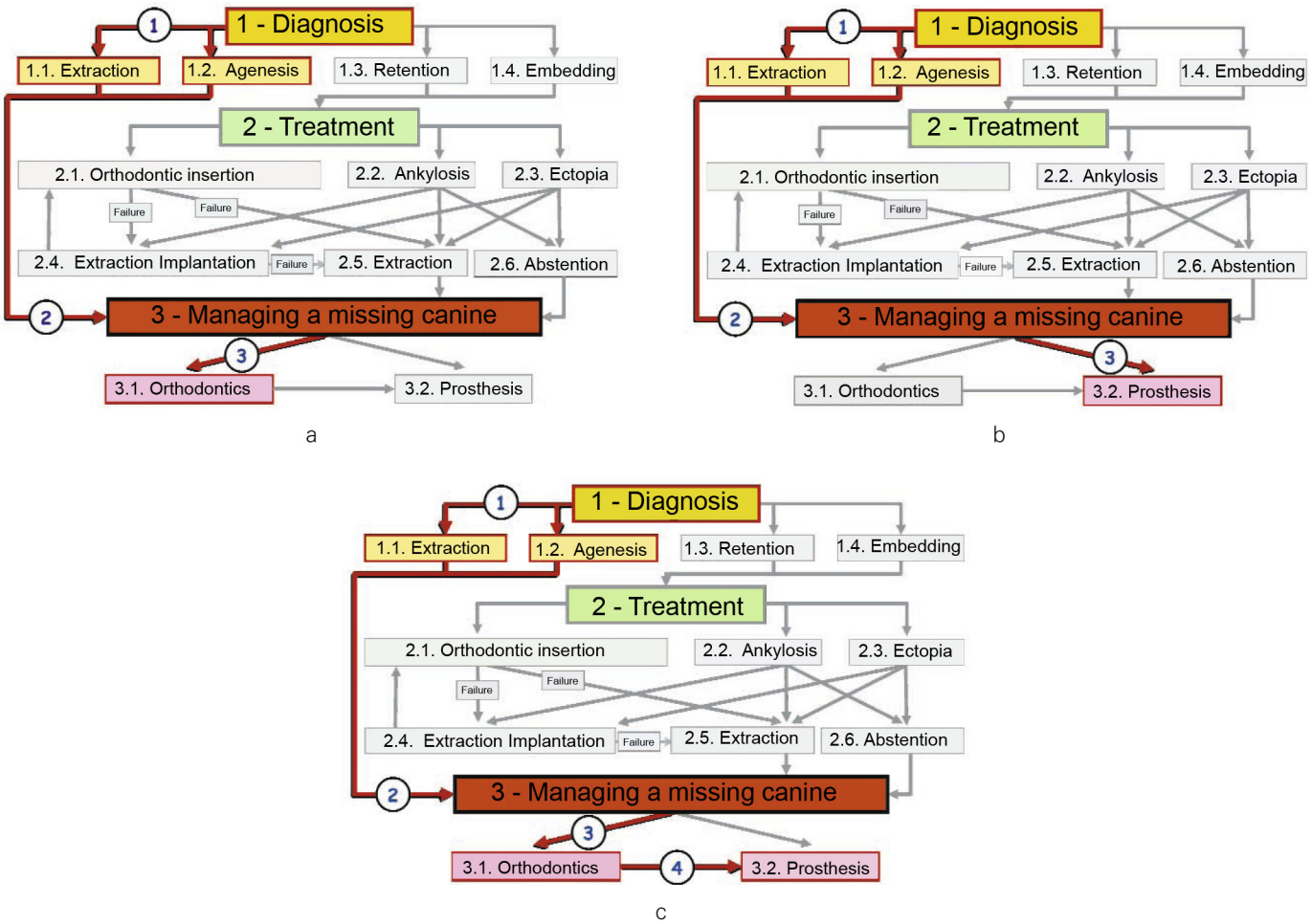


Figure 3 a to c
Extracted canine or agenesis: Therapeutic decision tree.

Three situations are possible depending on the available space in the arch and its manipulation.

a - orthodontic treatment can compensate for the absence of a canine by moving the first premolar into its site as a component of the over-all correction of the malocclusion. dysmorphism.

(Sequence 1 → 1.1 or 1.2 → 3 → 3.1).

b - If the clinical situation allows, that is if adequate space is available and no crowding exists elsewhere in the dental arches, the treating dentist can replace the missing canine prosthetically without prior orthodontic treatment.

(Sequence 1 → 1.1 or 1.2 → 3 → 3.2).

c - Orthodontic treatment can create the coronal and apical space necessary for insertion of an implant or fixed or removable dental prosthesis as a single procedure or in the course of correcting other aspects of malocclusion, if they are present.

(Sequence 1 → 1.1 or 1.2 → 3 → 3.1 → 3.2).

replacements without any preliminary orthodontic treatment when they deem patients have reached the appropriate age, which is at the end of the facial growth period. Until this time, they may decide to use temporary cemented bridges, bonded artificial teeth, or removable plates bearing an acrylic tooth as space maintainers and to improve the patients' appearance. Patients and families must be made fully aware of the possibility that a single implant placed in a young patient may not accommodate itself to alveolar development throughout life thus falling out of occlusion and acquiring an unsightly gingival festooning not in harmony with those of adjacent teeth (fig. 3 b, sequence 1, 1.1 or 1.2, 3, 3.2).

• A third solution requiring a preliminary orthodontic stage to prepare for a satisfactory prosthetic replacement must be envisaged, one that would be accompanied by all the advantages and, primarily, disadvantages elucidated for immediate placement of a prosthesis or an implant. (1, 1.1 or 1.2, 3, 3.1, 3.2).

If there is a choice, the first solution, moving the first bicuspid into the canine position, in spite of its occlusal and aesthetic drawbacks, will usually be the "least of three evils" because it has the best long-term biological prognosis.

2 - RETENTION - EMBEDDING

2 - 1 - Definitions

An over-retained tooth is one that has not appeared in the arch at the scheduled time. It usually retains its eruptive potential but is delayed in emerging because its root formation has not been completed.

Prevalence of dental impactions	Maxillary		Mandible	
	Frequency	Rank	Frequency	Rank
3rd molar	18.00%	2	22.00%	1
Canine	1.00%	3	0.10%	

Figure 4
Prevalence of maxillary canine impaction is not extremely rare, ranking in 3rd place with a frequency of 1% for the maxilla. It does not occur more frequently on the left or right side of the arch nor in one sex more than in the other.

An impacted tooth is one that has not appeared in the arch at the appropriate time even though its root formation is complete. It is no longer supposed to possess spontaneous eruptive power. Over-retention always precedes dental impaction.

This differentiation in definition is not just a semantic one because it has obvious therapeutic implications. An over-retained tooth may begin to erupt spontaneously whereas an impacted tooth always needs the assistance of orthodontic traction to move into position.

The frequency with which specific teeth are impacted is summarised in the table in figure 4. The maxillary canines are in third position with a frequency of 1%, far behind the first ranked wisdom teeth.

2 - 2 - Different diagnoses

Dentists can often make a clinical diagnosis of impaction or over-retention for a canine missing from the arch by inspection and palpation of the buccal and lingual zones where the tooth is likely to be found. However, a positive diagnosis requires panoramic and scanning tomodensity X-ray films (fig. 5).

The panoramic film is a sure way of determining the presence or absence of an embedded or retained canine (fig. 5 a) except in the rare cases where the impacted tooth lies near the orbit, outside the range of panoramic films. Teeth in this unusual position can be discerned with a cephalometric profile film. (fig. 5 b).

Tomodensitometry is now the reference examination for diagnosing and locating the canine accurately. It provides a 3D construction that orients and details the tooth's relationship with neighbouring teeth and assesses the possible presence of ankylosis and/or root resorption (fig. 5 c).

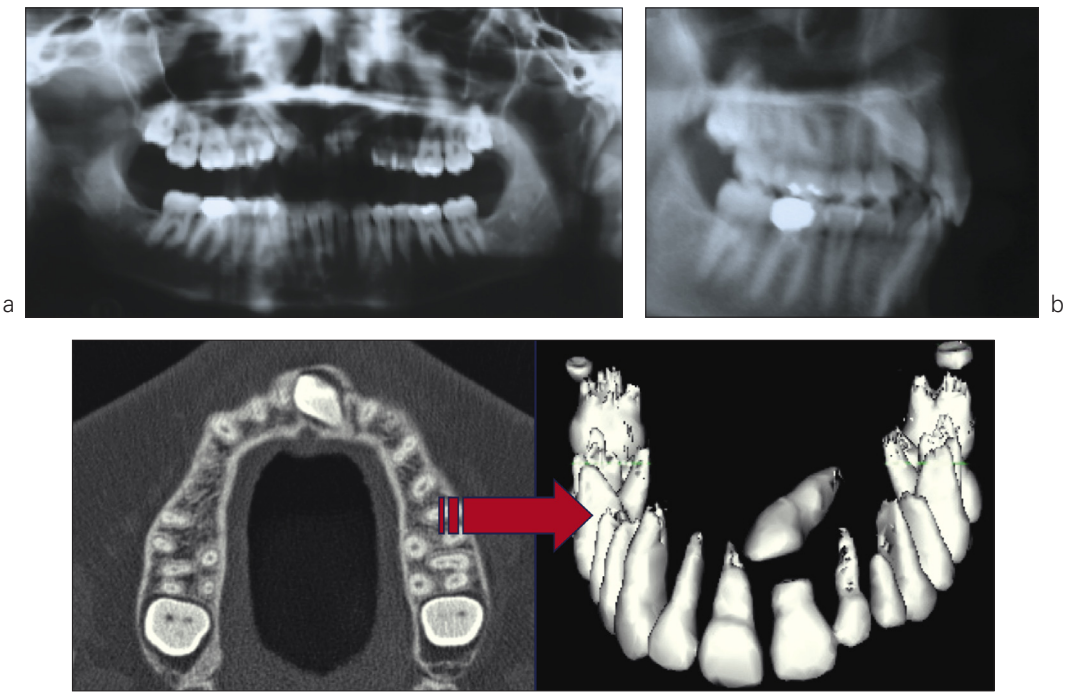


Figure 5 a to c
Impacted or over- retained canine: supplementary examinations.

a - the panoramic film, which, even if it does not have the precision necessary to locate the tooth accurately, is a systematic examination used to make a diagnosis.

b - examination of a cephalometric film in a case of high ectopia resolves any doubt on possible agenesis.

c - tomodensitometry specifies the exact location of the embedded tooth through a 3D reconstitution.

3 - TREATMENT OF RETAINED AND IMPACTED CANINES

When dealing with impacted or over- retained maxillary canines, orthodontists will plan their appliance set-up, if they decide treatment is feasible, depending on the difficulties involved, which may include:

– the presence of ankylosis;
– the topographic ectopic location of the tooth and its relationships with neighbouring teeth and structures;
– the patient's age;
– the patient's dental history.

3 - 1 - Bringing an impacted or over-retained canine tooth into the arch orthodontically

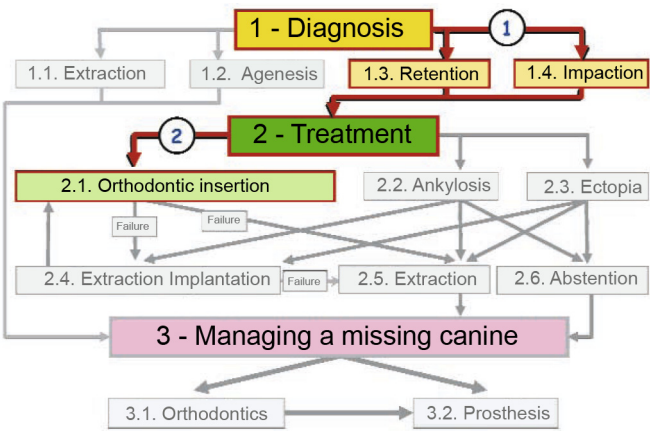


Figure 6
Impacted or over-retained canine: orthodontic management of an impacted maxillary canine.
(Sequence 1 → 1.3 or 1.4 → 2 → 2.1).

Even in the absence of diagnosed ankylosis and ectopia, movement of an impacted tooth into the arch requires a strict therapeutic sequence (fig. 7 a to v). Orthodontists must not try to begin any treatment stage until the previous one has been completed.

- **Stage 1: Opening space for the canine**

To avoid incorrect positioning, particularly axial rotation of the tooth at the end of treatment, it is essential that the orthodontist create enough space to accommodate its mesiodistal diameter, as determined by a measurement of its contralateral tooth if there is one, plus one millimetre. In the absence of the missing tooth's mate, the orthodontist can use the first premolar as a reasonably good approximation.

- **Stage 2: The appliance set-up**

If traction is to be used directly on the orthodontic arch, this must be rigid enough to avoid deformation during orthodontic movement. And the orthodontist must provide a means, a welded or crimped hook, of securing the wire, spring, or elastic thread attached to the tooth to the arch for activating traction.

- **Stage 3: Surgical stage**

After removing a generous amount of bone from around the tooth, taking care not to damage the cemento-enamel junction, the surgeon bonds a bracket, button, or cleat to the crown so that orthodontic traction can begin immediately.

To prevent this attachment from being obscured by fibrous mucosal tissue, the surgeon may place a surgical dressing to protect the tooth during the healing stage. Without it contraction of scar tissue might set up a counter-balancing force to the

orthodontic traction, slowing desired movement or even blocking it entirely. This is an especially important procedure when the orthodontist is compelled to use a ligature wire as a connector between tooth and arch wire because its thinness would make it an easy victim to engulfing scar tissue whose density would prevent the applied traction from being transmitted to the tooth.

If the approach is buccal precautionary periodontal treatment must begin immediately to prevent loss of epithelial attachment to the tooth.

After bonding the attachment and beginning traction, operators can stimulate initial movement by gentle application of an elevator sickle-shaped syndesmotome to the enamel surface. But here again they must be careful not to damage the cemento-enamel junction because a lesion in the cementum could provoke ankylosis. An additional safeguard against ankylosis is the prompt start of orthodontic movement.

- **Stage 4: Orthodontic traction**

Fifteen days after the operation, on removing the surgical dressing, the orthodontist should check the tooth's mobility by applying lateral force to it with a tweezers. If the tooth shows obvious mobility, or even in the absence of mobility if the patient senses a movement, the prognosis can be deemed good, but if it does not budge or if the patient doesn't sense any movement, the tooth is probably ankylosed and the prognosis is poor.

When surgeons have been able to expose only a limited area of the impacted tooth, they are often unable to tell whether they are bonding an attachment to the crown's labial or palatal surface. As a result it is not unusual for an Impacted canine to be brought into the arch rotated 180°. To prevent this from occurring the surgeon should use a short, straight probe to note the presence or absence of the cingulum and proximal palatine ridges of the canine as indicators of the exposed surface so that appropriate adjustments in the direction of the application of traction can be made.

If small elastic chains or hollow elastic threads are used to begin moving the impacted tooth, they should be changed regularly at least every fifteen days. The orthodontist should be careful to avoid irritating neighbouring soft tissues because scarring of the fibromucosa could impede or prevent transmission of force to the tooth.

- **Stage 5: Cementing an orthodontic attachment**

As soon as the crown nears its correct place in the arch, the orthodontist can replace the original bonded cleat or button with a bracket to achieve better control of the tooth's movement. It is not always possible to position the bracket precisely at this stage, so the orthodontist may have to re-bond it one or more times before an ideal placement can be made.

- **Stage 6: Using an arch wire to improve control of tooth movement**

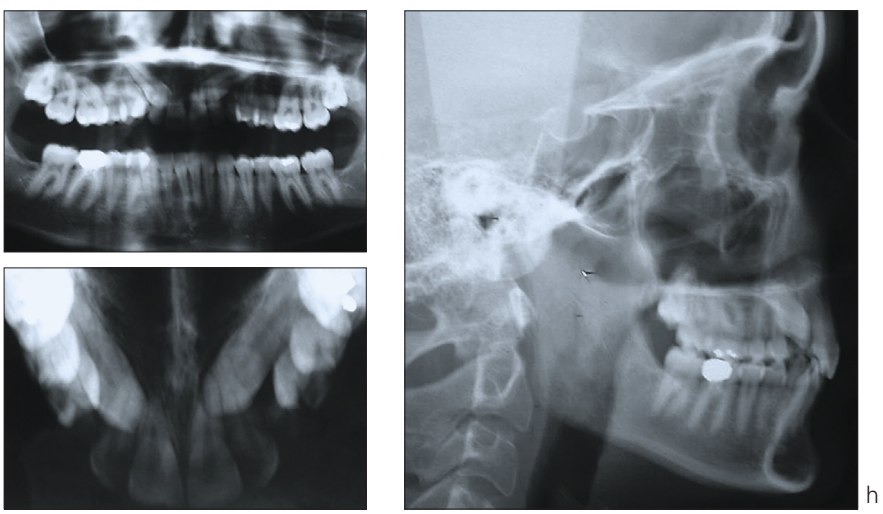
To improve control of the canine's movement, the orthodontist should ligate a flexible arch wire into the canine bracket as soon as possible. While placement of the crown in its correct position in the arch usually presents no problems, it is sometimes much more difficult to achieve proper positioning of the root and apex.

a b c

a to c: facial photographs at the start of treatment.
Treatment provided by Coralie Fauquet as part of the University of Garancière's Clinical Diploma in Lingual Orthodontics program.

d e

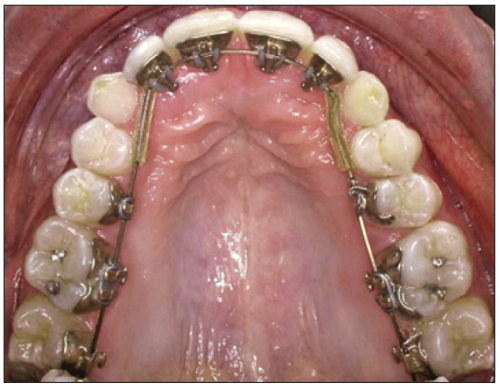
d and e: initial intra-oral views: Angle Class II division 2 malocclusion associated with the absence of the upper right and left permanent canines. Palatal to the temporary canines that are still in place, two bulges indicating the presence of the impacted permanent teeth can be seen.



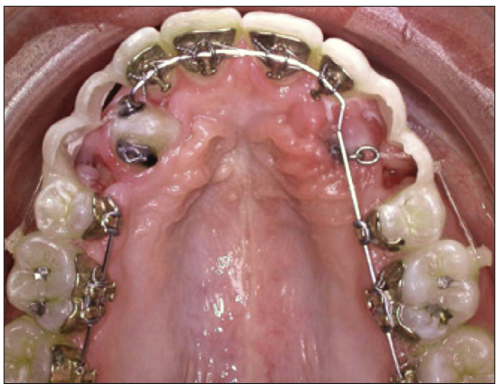
f g h

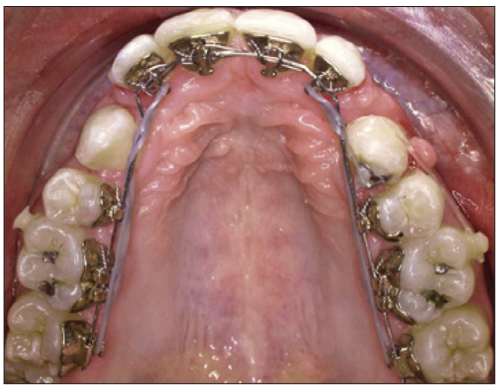
f to h: radiological examination at the start of treatment: The maxillary right and left canines are palatally impacted.

Figures 7 a to h
Treatment sequence for impacted or over- retained canines

i   j

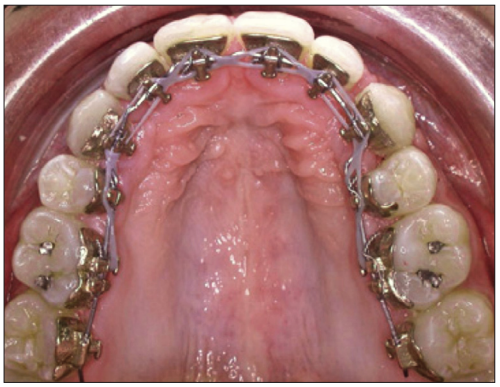
I and j: Stage 1: opening spaces. After the appliance was placed, the upper left temporary canine was exfoliated naturally leaving space for its permanent successor, which began to erupt spontaneously.

k   l

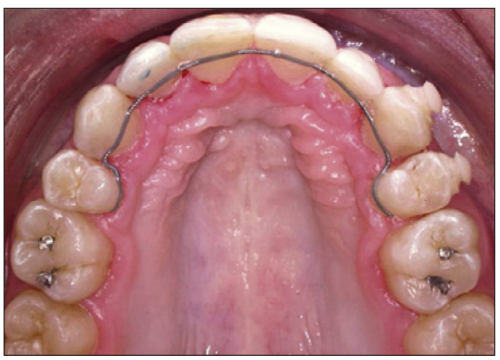
m   n

k to n: Stage 4: Application of traction - After extracting 63, 14 and 24, the surgeon uncovered the impacted upper left canine tooth, bonded an attachment to it, and placed an acrylic tooth to serve as a cosmetic unit until the impacted tooth reached its place in the arch. Traction was applied with a hollow elastic thread whose direction of force was designed to avoid any interference with neighbouring teeth and surrounding tissues.

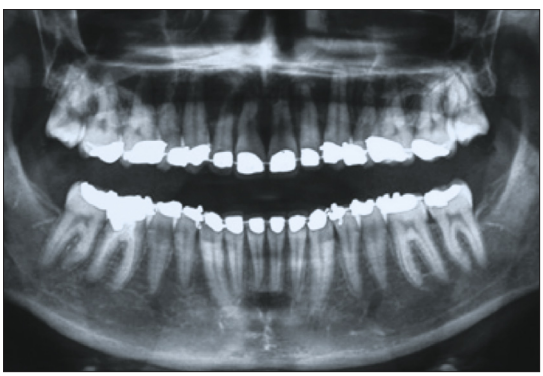
Figure 7 i to n
Embedded or retained canine: treatment chronology.

o   p

o and p: Stage 5: bonding attachments and treating the teeth in the orthodontic arch.

q   r

q and r: Stage 6: occlusal finishing and correction of axial inclinations of teeth.

s   t

s and t: End of treatment documents.

Figures 7 o to t
Impacted or over- retained canine: treatment sequence.

u   v

u to v: End of treatment documents.

Figures 7 u to v

Impacted or over-retained canine: treatment sequence.

This procedure sometimes fails because of undiagnosed ankylosis or its development as a result of inappropriate force application. If this happens, the tooth can be extracted and re- implanted after the ankylosis lesion in the cementum has been removed and replaced with a glass-ionomer restoration. After a six week rest period the orthodontist can resume moving the tooth toward its proper place in the arch (fig. 8).

If this procedure also fails, the tooth will have to be extracted and replaced by moving a bicuspid into its place or by prosthetic treatment as described in chapter 1.1.2 (fig. 9).

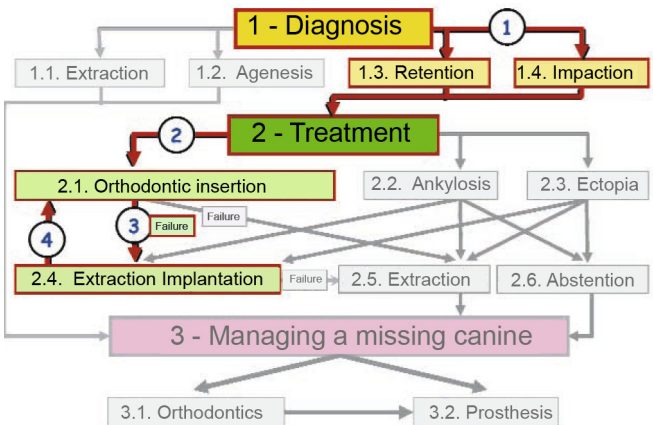


Figure 8

Impacted or over-retained canine: moving an impacted maxillary canine can fail owing to undiagnosed ankylosis or its development during traction. Extraction and re-implantation of the tooth can then be attempted with orthodontic movement of the tooth resuming after a month and a half.

(Sequence 1 → 1.3 or 1.4 → 2 → 2.1 → 2.4 → 2.1).

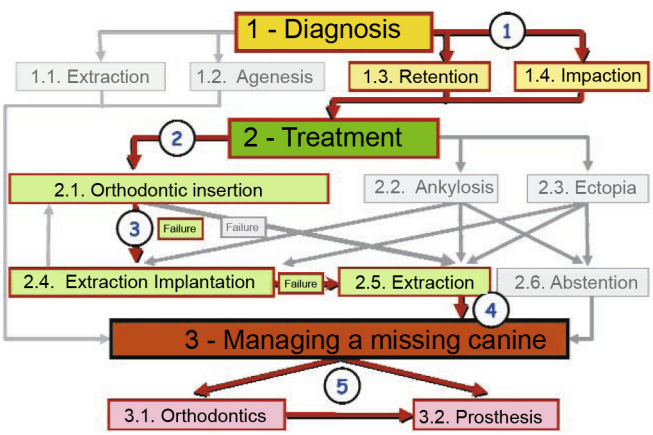


Figure 9

Impacted or over-retained canine: after ankylosis prevents the tooth from being moved into place orthodontically and its extraction and re- implantation have also failed, it must be extracted and replaced by moving a bicuspid into its place or by prosthetic means.

(Sequence 1 → 1.3 or 1.4 → → 2.1 → 2.4 → 2.5 → 3 → 3.1 and/or 3.2).

3 - 2 - Ankylosis

Ankylosis results from destruction of an area of the periodontal membrane and an activation of its osteoclastic and osteoblastic cells that unite a portion of the investing bone to the tooth's cementum, which is a histologically similar tissue. In a sense, ankylosis is a bone colonisation of the root surface.

An area of 1 mm² of root ankylosis is enough to make orthodontic movement of the tooth impossible. This lesion is irreversible, so it is essential for the original examination be precise in helping select the best treatment approach from the choices of orthodontic movement of the tooth into position, orthodontic movement of a bicuspid into its place, its replacement prosthetically or with an implant, or by benign neglect and routine follow-up examinations.

In spite of the progress of imaging, particularly with tomodensitometry, it is still difficult to make a reliable diagnosis as to the presence or absence of dental ankylosis, particularly if it not extensive. Indeed, the volume of a voxel (0.4 x 0.3 x 0.3 mm) is smaller than that of a cell, so cannot be used to diagnose ankylosis below this volume (fig. 10). Therefore, the absence of a visible image does not mean there is no ankylosis. On the other hand, if it is detected radiologically, this rules out any orthodontic movement of the tooth.

With the exception of teeth whose crowns are ankylosed (fig. 11), ankylosis does not occur spontaneously or naturally. It results from:

– either a previous surgical manipulation (cutter, elevator or

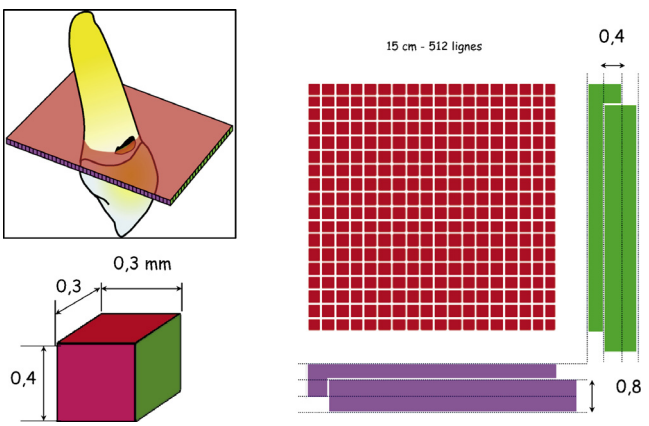


Figure 10
Tomodensitometry: diagnosis of ankylosis.
Even if the successive 0.8 mm thick sections are half overlapping, the volumetric precision of each voxel in no better than 0.036 mm³ which is far from the level of precision required for diagnosis of ankylosis whose volume is smaller than this dimension. Just because an ankylosis lesion does not appear on a tomodensitometric view, this does not prove that one is not there.

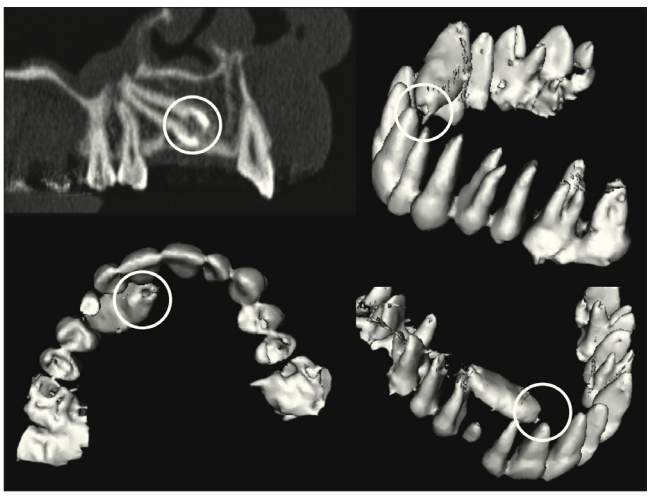


Figure 11
Tomodensitometry: crown ankylosis.

syndesmotome) which has altered the periodontal membrane and provoked bone replacement resorption;

– or a root lesion by compression of bone or root cementum during orthodontic traction. So before any attempted positioning, it is essential to analyse the obstacles along the tooth's route to avoid any risk of the development of ankylosis (see fig. 11).

If ankylosis is diagnosed, orthodontists should not be deluded into thinking they can bring the tooth into position without first treating the ankylosis.

There are three possible solutions:

• Do nothing if the tooth, which has been impacted for a long time in a highly ectopic position, gives no indication in a radiographic examination that it will begin to erupt and disturb a prosthetic replacement (fig. 12). We have explained the protocol for filling the space left by an absent canine in chapter 1.1.2.

• Extract the tooth if the conditions for the previous solution are not met. In particular, if its position might prevent pre-prosthetic orthodontic treatment because it could interfere with the teeth to be moved or if its position could prevent optimal placement of an implant (fig. 13). But orthodontists must consider the possibility that the bone loss that could accompany the extraction of an impacted tooth might affect the feasibility of using an implant to replace it.

• A third possibility consists of extracting the canine and implanting it in a newly formed osseous alveolus (fig. 14). After extraction, the orthodontist must carefully remove any osseous tissue from the root's cementum and replace it with glass-ionomer cement. Then they can place it in its new

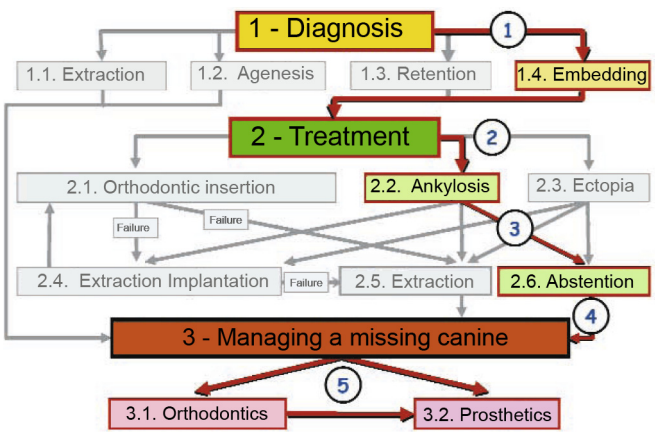


Figure 12

Ankylosed embedded canine: if the canine shows no sign of spontaneous movement and its position does not interfere with a prosthetic replacement, therapeutic abstention followed by regular radiological monitoring to insure that the tooth has not begun to erupt is a good solution.

(Sequence 1 → 1.4 → 2 → 2.2 → 2.6 → 3 → 3.1 and/or 3.2).

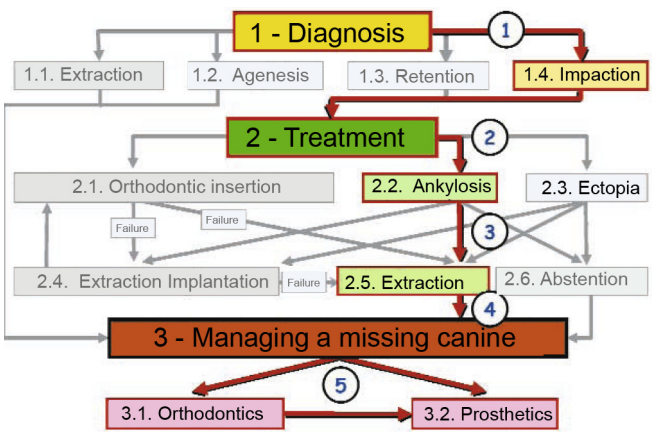


Figure 13

Ankylosed impacted canine: if the canine is an obstacle to pre-prosthetic orthodontic treatment, or if its presence might interfere with the placement of an implant, its extraction must be considered.

(Sequence 1 → 1.4 → 2 → 2.2 → 2.5 → 3 → 3.1 and/or 3.2).

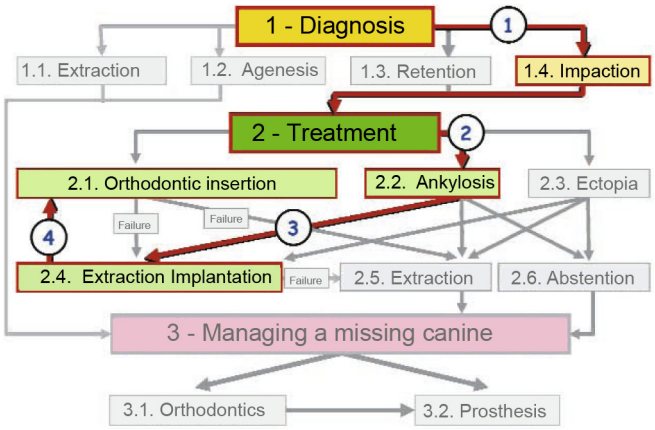


Figure 14
Ankylosed impacted canine: if the tooth is not too far from its site in the arch and no risks will be incurred in extracting it, it can be removed and re-implanted into a newly formed alveolus
(Sequence 1 → 1.4 → 2 → 2.2 → 2. → 2.1).

position in fixed retention with one of its adjacent teeth and slightly out of occlusion to protect it from trauma for a minimum of 40 days.

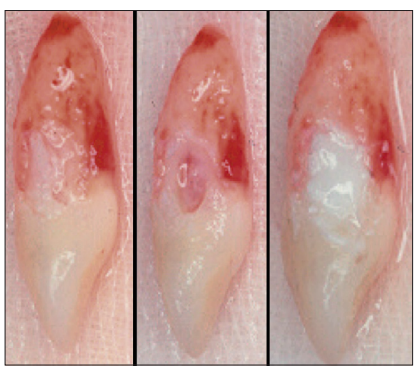
It should be treated endodontic ally one week after its re-implantation to minimise the risk of infection during the initial healing phase. After one and a half months, orthodontic movement of the implanted tooth can begin (fig. 15 a to h).

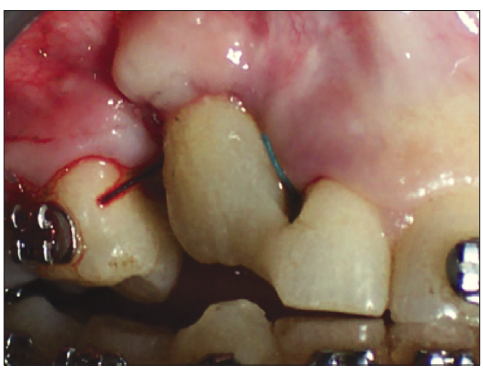
This extremely "operator dependent" solution has enjoyed a five-year success rate of 95% with no signs of ankylosis or resorption. In the 5% cases of f failure, the tooth must be extracted and replaced with a restoration. (fig. 16 and chapter 1.1.2.).


a


b

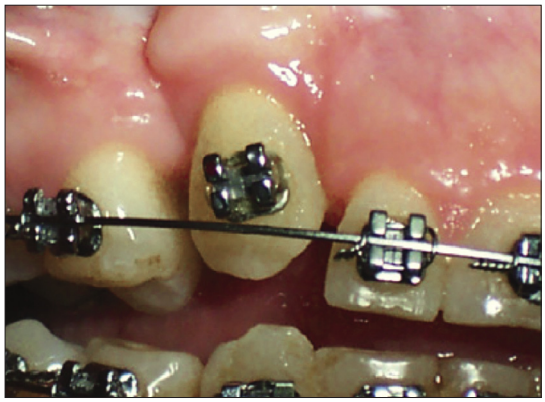
a and b: A first attempt to move this impacted upper right canine into position provoked a cervical lesion that was, responsible for its becoming ankylosed.


c


d

c and d: After extraction, the lesion was removed and a glass-ionomer cement restoration was placed in the cavity. Once positioned slightly out of occlusion, the tooth was bonded to the adjacent lateral incisor with a rigid composite bridge to retain it. (Operation and documents Alain Garcia).

Figures 15 a to d
Extraction/implantation of a canine displaying partial ankylosis.
Treatment provided by Patrick Faranaz as part of the Garancière CECSMO.

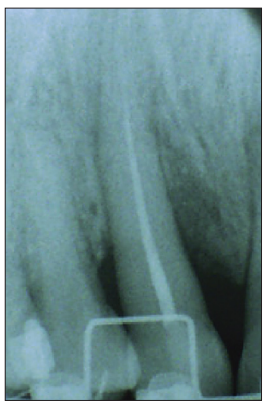


e

f

e and f: one and a half months after surgery, the fixed retention was removed and a bracket was bonded to the canine so that orthodontic treatment could resume.

g



h

g and h: A year after surgery, the canine is in position with its periodontal membrane having moved with it. After orthodontic movement surrounding bone has filled in adequately around its root.

Figures 15 e to h
Extraction/implantation of a canine displaying partial ankylosis.
Treatment provided by Patrick Faranaz as part of the Garancière CECSMO.

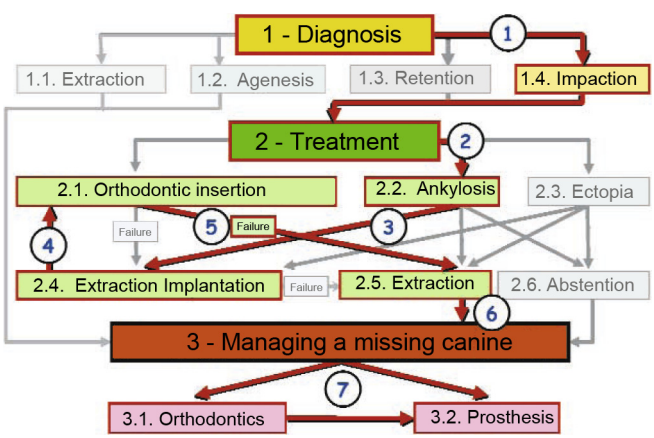


Figure 16
Ankylosed impacted canine: if extraction/implantation of the tooth or orthodontic positioning has failed, the tooth should be extracted and its replacement envisaged.
(Sequence → 1 → 1.4 → 2 → 2.2 → 2.4 → 2.1 → 2.5 → 3 → 3.1 and/or 3.2).

3 - 3 - Ectopic canine

An ectopic canine results from an atypical eruption path. Often linked to an obstacle in its path, it can also be caused by previous trauma to the region that may cause it to become ankylosed.

Treatment of this type of tooth is very similar to that of ankylosed canines (fig. 17, 18, 19 and 20).

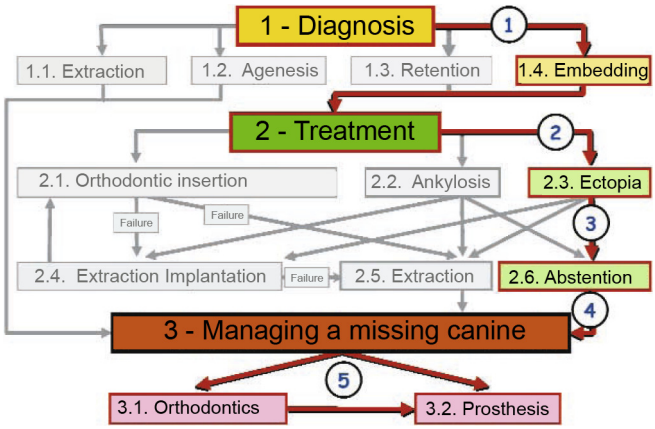


Figure 17

Ectopic embedded canine: if the canine does not show any sign of spontaneous movement and if its situation does not interfere with its prosthetic replacement, therapeutic abstention is a good solution with regular radiological monitoring to check the tooth's immobility.

(Sequence → 1 → 1.4 → 2 → 2.3 → 2.6 → 3 → 3.1 and/or 3.2).

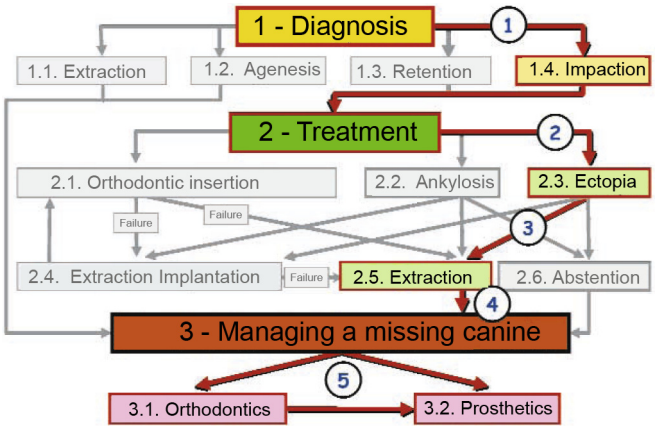


Figure 18

Ectopic embedded canine: if the canine presents an obstacle to pre-prosthetic orthodontic treatment or if its presence counters the insertion of an implant, tooth extraction may be envisaged.

(Sequence → 1 → 1.4 → 2 → 2.3 → 2.5 → 3 → 3.1 and/or 3.2).

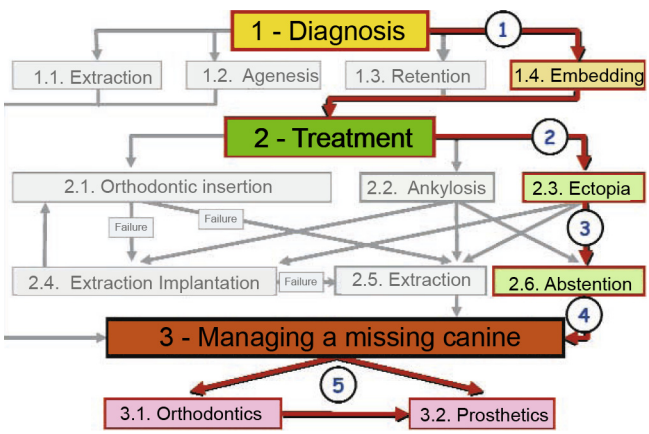


Figure 19

Ectopic impacted canine: if the tooth is not too far from its eruption site and no risk will be incurred by extracting it, it may be removed and re-implanted into a newly formed alveolus.

(Sequence 1 → 1.4 → 2 → 2.3 → 2.4 → 2.1).

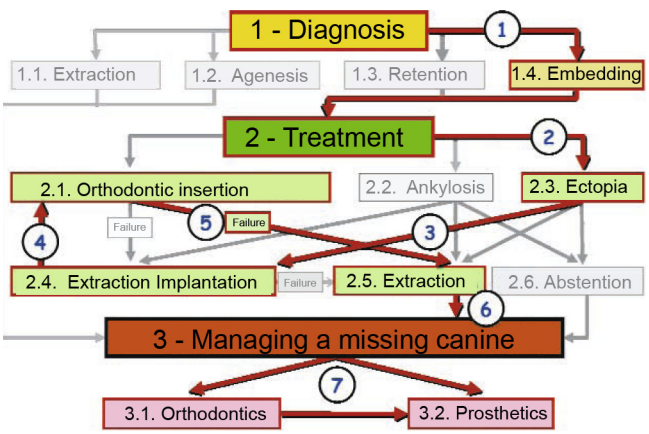


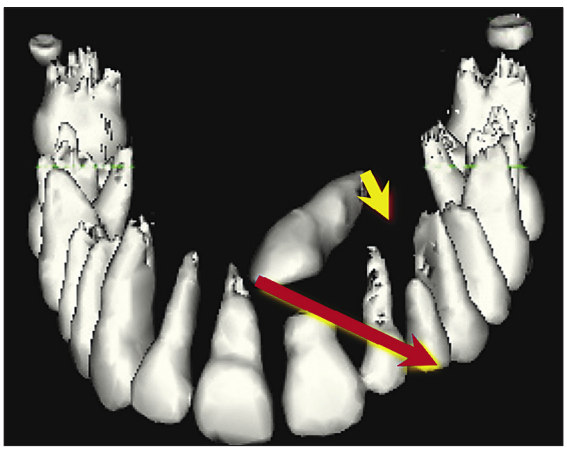
Figure 20

Ectopic embedded canine: if its extraction and re-implantation or orthodontic movement into position have failed, the tooth should be extracted and a restoration put in it place in the arch.

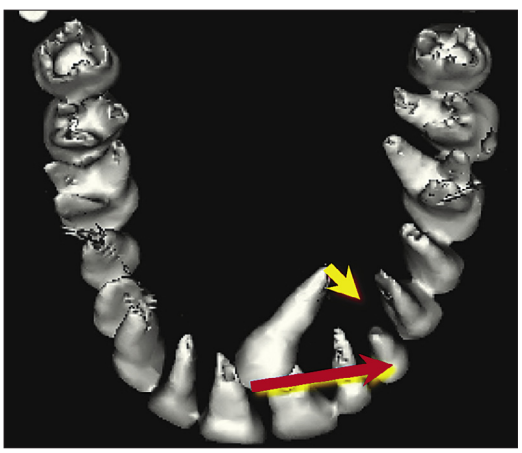
(Sequence → 1 → 1.4 → 2 → 2.3 → 2.4 → 2.1 → 2.5 → 3 ® 3.1 and/or 3.2).

Before making any therapeutic decision, it is essential to evaluate the feasibility of orthodontic positioning by careful analysis of the potential obstacles along the coronal and apical pathways of its proposed route into the arch. Possible contacts between the impacted tooth and any of its neighbours make the prognosis bleak, not only because of the mechanical obstacles involved but also because of the potential for ankylosis which may be provoked (fig. 21 a to i).

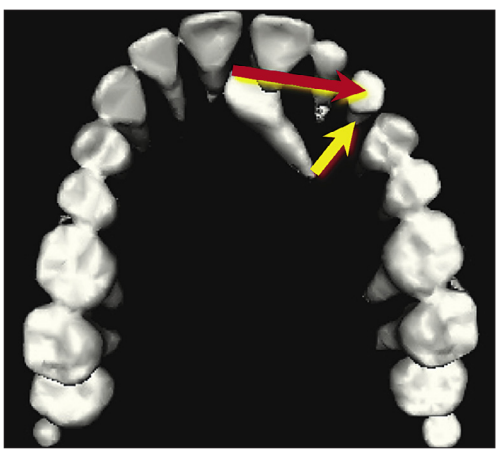
Tomodensitometry can be used to locate the tooth and to form an



a



b



c

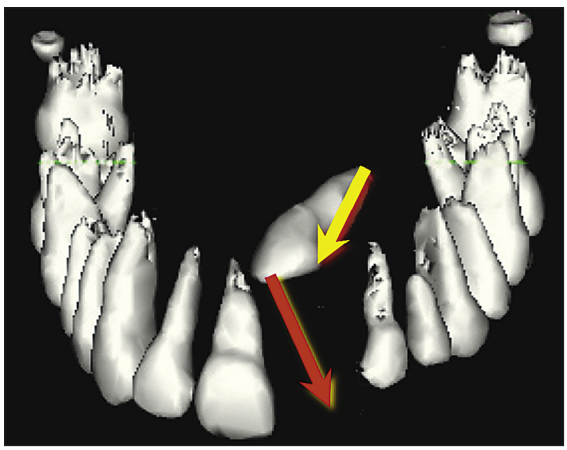
Figure 21 a to c
Tomodensitometry: insertion pathways

In deciding whether or not to attempt to bring an impacted canine into the arch, orthodontists must take into account the obstacles this tooth risks meeting along the way. Any interference likely to prevent its movement is an absolute contraindication for orthodontic movement.

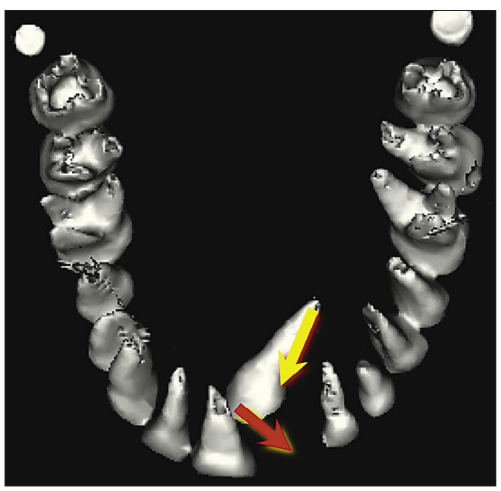
a to c: It would be impossible to bring this impacted upper left canine into its correct place in the arch because the upper left lateral poses an implacable barrier to movement of its crown.

accurate prognosis for its being placed correctly into the arch.

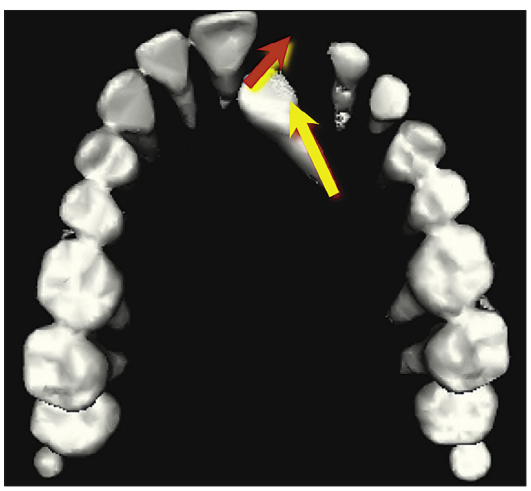
This analysis is used to orient treatment by choosing a reasoned solution. Figure 17 shows the impossibility of moving the upper left canine into its place in the arch because its crown would have to "pass through" the root of the upper left lateral to get there.



d



e



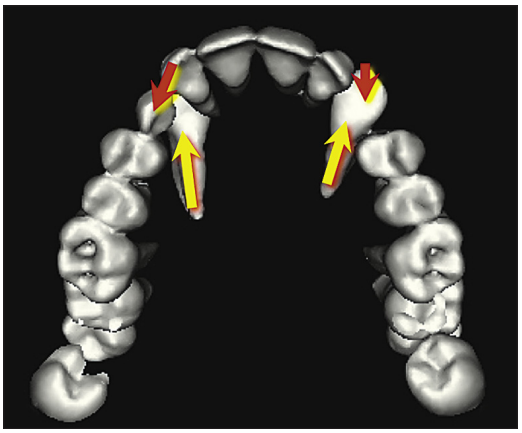
f

Figure 21 d to f
Tomodensitometry: insertion pathways

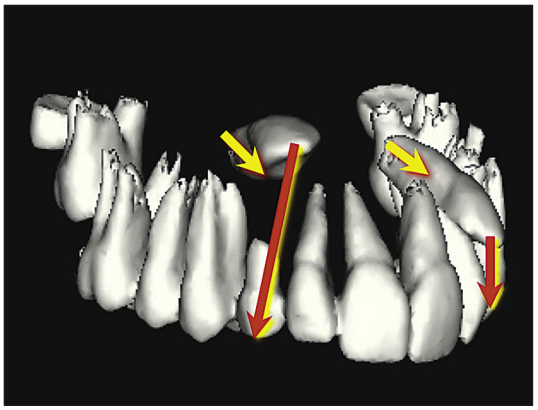
In deciding whether or not to attempt to bring an impacted canine into the arch, orthodontists must take into account the obstacles this tooth risks meeting along the way. Any interference likely to prevent its movement is an absolute contraindication for orthodontic movement.

d to f: The movement of the impacted upper left canine into the site of the extracted upper left central will not encounter any obstacles for crown or root. The prognosis is therefore favourable.

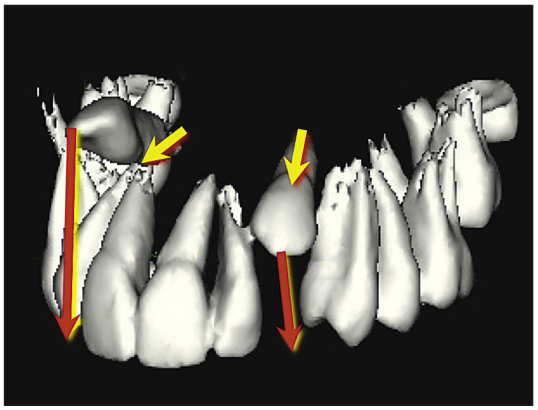
But if the orthodontist decides to place the upper left canine in the place of the upper left central, whose root has been gravely resorbed, after its extraction the prognosis will be favourable because all obstacles to movement of the impacted tooth's crown and root will have been removed.



g



h



i

Figure 21 g to i
Tomodensitometry: insertion pathways

In deciding whether or not to attempt to bring an impacted canine into the arch, orthodontists must take into account the obstacles this tooth risks meeting along the way. Any interference likely to prevent its movement is an absolute contraindication for orthodontic movement.

g to i: The prognosis for moving an ectopic canine into its place in the arch depends more on the obstacles that its crown and root may encounter in their projected pathways than on the distance separating the tooth from its normal eruption site. Even if the position of this upper right canine presents a challenge, an analysis of the coronal and apical pathways does not reveal any potential obstacles and the prognosis is, accordingly, favourable.

4 - CONCLUSION

When an impacted canine has not assumed its position in the arch, orthodontists must determine whether the space they observe clinically has been caused by the tooth's previous extraction, its agenesis, or its being impacted or over-retained.

Tomodensitometric examination is still imprecise for diagnosing ankylosis, but it is nevertheless the examination of choice for determining the position of an impacted or over-retained canine as well as its relationship with neighbouring structures. To decide whether to move it into place orthodontically, to extract it, or to follow a policy of benign neglect, the orthodontist must assess the position of the impacted tooth, the presence or absence of ankylosis, the patient's age, and the patient's dental history. Every case is unique and a risk/benefit analysis must be performed for every possible solution.