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Cases of ASSUMED IDENTITY

Only the dental fraternity regularly analyse teeth in the anterior segment but almost everyone knows when a smile looks right or wrong. Popular author and physicist Paul Davies has written on how in the 1950s, scientists observed patterns amongst newly discovered subatomic particles and predicted the existence of others from anomalies in the sequence, 'like gaps in the smile'. People understand instinctively when a smile appears somehow different.

Young adults are usually missing anterior teeth because they are either congenitally absent or extracted due to severe crowding. Fortunately, loss due to trauma is uncommon. Teeth that are present tend to assume the position of the absentees to some extent, so spacing is usually only moderate. While patients are regularly dissatisfied with the appearance of their front teeth, many do not appreciate exactly the nature of the problem.

TREATMENT OPTIONS

Usually, there are a number of treatment options and all have advantages and disadvantages. Orthodontics, for instance, can reliably move teeth into an orthodox position so that the missing tooth (or teeth) can be replaced with either an implant or some type of bridge.

From one perspective this is a comprehensive treatment. Narrowing of the arch, axial tilting and any centreline shifts can be corrected. Prostheses, whether pontics or implants, can achieve remarkable aesthetics. Nevertheless, many patients are reluctant to pursue such courses of treatment and perceive them as prohibitively expensive and time consuming. Some will view surgery, or the tooth preparation associated with indirect bridging, as invasive and certainly irreversible.



Fig 1. Canines were grossly crowded and first premolars had drifted well mesially.

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Patients' concerns must be respected. The concept of informed consent requires more than simply explaining a single, favoured treatment. It implies the dentist has a responsibility to not only advise, but, where possible, present a range of options, together with their benefits and drawbacks.

There is, for instance, a significant biological, as well as financial cost incurred if a conventional bridge is placed. Research suggests that preparation for full coverage removes 63–72% of coronal structure. One study found that over a 10-year period, 29% of originally vital abutment teeth lose pulp vitality. The risk of future endodontic involvement must be explained.

Without certain basic information, consent cannot be considered informed.

As an alternative approach, if one tooth has assumed the basic position of another, it is possible to change its appearance to mimic that of the one it replaced. Judicious enamel contouring and direct bonding can transform a tooth's appearance, while at the same time subtly altering its position in the arch. Upper canines can be modified to resemble lateral incisors; first premolars can virtually assume the identity of canines.

CASE STUDY – CONVERTING A FIRST PREMOLAR

The patient was a 21-year-old woman, concerned about extreme crowding of her upper canines (Fig 1). First premolars had drifted some millimetres mesially and, to a lesser extent, buccally, while they had also rotated disto-buccally. The lipline was reasonably low.

The patient had previously had an orthodontic consultation but did not want to pursue this treatment. Following discussion it was suggested that the canines could be extracted and the upper 4s altered to effectively replace them in the arch. It was explained that enamel trimming carried a very small risk of pulpal damage.



Fig 2. The premolars have taken on the appearance of canines.



Fig 3. The length of the new canines is limited by the occlusion against the lower 4s.

CONTOURING

Trimming was to be done incrementally over two visits to allow surface rehardening and to minimise any potential for pulpal trauma. At the first operative appointment, initial contouring of the premolars was begun and enamel trimmed from the buccal walls and cusps. The buccal tips of the 34 and 44 were also reduced, as these occluded between the cusps of the uppers. Fluoride varnish was applied and the patient instructed in the use of Recaldent Tooth Mousse™ and fluoride gel. The canines were then extracted.

Four weeks later the contouring was completed with the buccal surfaces sloped at an angle to reproduce palatally inclined canines. Because the 24 was positioned wider than its counterpart, effectively it had to be moved inwards and the reduction of its buccal wall extended up to the gingival margin at a depth of almost 1 mm. Here it ended in a chamfer, in a similar fashion to a crown preparation.

Both teeth were shaped to display incisal attrition, since their length was limited by occlusion against the lowers (Fig 2,3).

COMPOSITE BUILDUP

Composite resin mock-ups were then used to determine the correct shade combination. A small amount of trichloroacetic acid was applied to the gingiva to prevent exudate seepage and the teeth were cleaned and etched. Adhesive was applied and cured.

The technique for building up the mesial surfaces shared similarities with that for closing a dyastema. A transparent plastic strip was to act as a matrix and, to steady it and achieve adaptation of the composite against enamel, it would have to be pulled against the tooth. The dilemma was that, without some resistance, the pulling extrudes material and loses any contour before curing.

To position and secure the strip, the first step in the bonding was placing small *supporting wings* of flowable composite extending 1 to 2 mm from the mesial walls. Using a fine tip syringe, composite was slowly extruded outward from the enamel, all the while shining the white light.

Regular composite resin is viscous, so to avoid trapping air bubbles, a further small amount of flowable material was placed in crevices. The matrix strip was positioned, sloping from the gingival margin and the composite shades were then built up in steps, beginning at the cervical. Between each incremental placement and curing, resin adhesive was applied and blown with air to again reduce the likelihood of voids. To optimise the setting, any composite exposed to air was coated with glycerine to prevent oxygen inhibition and then further exposed to light.

CASE STUDY – CONVERTING A CANINE

The patient was a 25-year-old male congenitally missing lateral incisors (Fig 4). The canines had erupted mesially and slightly labially. The 13 had tilted, such that it crowded the central and the 23 rotated somewhat mesio-labially. The 11 had suffered a small mesio-incisal fracture and the 21 drifted into the available space, altering the centreline.



Fig 4. The congenital absence of lateral incisors had prompted the canines to erupt mesially.

Placing indirect crowns on the 3s would have required such extreme reduction that it was not a viable option unless endodontics was also undertaken. Instead it was decided treatment would again involve odontoplasties – changing the contour of these teeth to approximate that of the missing laterals.

SELECTIVE BLEACHING

Canines have greater colour saturation than incisors and appear even darker if dentine casts a shadow through thinned enamel. Therefore, a bleaching tray was constructed at the outset to selectively whiten the 3s to a shade consistent with laterals.

Conversely, bleaching agents can sometimes produce sensitivity and this is especially so when enamel is reduced. Various products will mineralise and partly occlude tubules but the oxygen ions released by peroxides are too small to be blocked by hardened tooth substance and will still move readily towards the pulp. A more effective strategy incorporates desensitising toothpaste with potassium salts to inhibit nerve transmission.

Following preliminary shaping of the canines the patient was asked to wear the tray with a slurry of Tooth Mousse and either Sensodyne or Colgate Sensitive toothpaste for three nights, before commencing bleaching. If symptoms arose the protocol was to be repeated.

Bleaching does not routinely interfere with adhesion but there is equivocal evidence that bonding *immediately* following whitening can lead to lower bond strengths. It is assumed this is due to oxygen temporarily trapped in the tooth inhibiting the adhesive's curing through competition with monomers in the polymerisation process. The patient was further instructed to cease bleaching one week prior to the next appointment.

CONTOURING

Four weeks later the contouring of the canines recommenced. The buccal and distal walls were effectively sculptured using a long, fine grit diamond bur, with the greatest reduction in the bulbous cervical regions. At the gingival margins the preparations ended in chamfers.

The mesial drifting of the 13 had reduced the space available for a realistic, rounded profile. To accommodate a composite buildup, the distal curvature of the 11 was reduced slightly.

Small mesio-labial bondings were then placed on both 3s to complete the illusion of lateral incisors (Fig 5).



Fig 5. Following contouring and bonding the canines have assumed the appearance of lateral incisors.

It has been suggested that a smile is most harmonious when, viewed frontally, laterals display approximately three-fifths the width of the centrals. Although the trimming of these teeth was extensive, the new incisors were still somewhat broader than most 2s. As the patient's central incisors lacked symmetry and required some restoration, it was decided to place thin direct facings, widen them appropriately and at the same time correct the centreline shift.

Following treatment the importance of good oral hygiene and a mineralising program was emphasised.

'GAPS IN THE SMILE'

Dentistry is a demanding, and at times, frustrating profession. Much of our treatment planning is formulaic and provides little intellectual challenge. In addition, patients can rarely give meaningful feedback as most have difficulty relating to the work we do. The caries that is detected radiographically can not be seen and usually does not hurt. Deep restorations, placed conscientiously, can precipitate symptoms that were not there previously.

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It is hard for people to know if we have done a good job or a bad one. On the other hand, everyone can tell when a smile looks a great deal better than it did before treatment.

Cosmetic problems normally have a variety of solutions but procedures such as shaping and bonding are simple and financially accessible to most individuals. Being able to devise and offer such treatments is highly satisfying and can benefit the patient in ways that are readily appreciated.

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