



Australian Society
of Orthodontists



University of Sydney



Implants &
Orthodontics

Creating Brighter Futures

Implants & Orthodontics



Introduction

Orthodontic treatment for children and adults can involve management of teeth missing due to agenesis, trauma, or extraction following dental disease or malformation. An interdisciplinary approach between the dentist and orthodontist, and often the implant surgeon and prosthodontist, is usually required to formulate the most appropriate treatment plan for the patient. A decision usually needs to be made as to whether the space or spaces should be closed orthodontically, or maintained for eventual prosthetic replacement. Over the last decade the reliability, predictability and long term success rate of implants has made them the prosthetic replacement of choice, especially when the teeth adjacent to the space are well formed and unrestored (PROFFIT, 2000; KOKICH, 2004).

When it is planned to incorporate implants into the orthodontic and restorative treatment plan, growth considerations, implant space requirements and implant site development are three of a number of treatment planning factors that need to be considered.

Growth Considerations

It is not usually appropriate to place an implant until completion of dento-alveolar development and skeletal growth. Throughout active growth the implant responds like an ankylosed tooth while the adjacent teeth continue

to erupt, creating a discrepancy between the gingival margin of the implant and the natural teeth. Particularly in a patient with a high lip line, this will produce a poor aesthetic result unless implant treatment is delayed until growth has been completed. (KOKICH, 2004).

Chronological age alone is not accurate in determining whether growth has been completed for an individual. We expect that most girls will have completed the majority of their active facial growth by 16 years of age and boys by 19 years of age. However, boys in particular can show significant late facial growth. Radiographic examination can help to determine whether active facial growth has been completed.

A hand-wrist radiograph is not appropriate for assessing facial growth because it is not specific enough for each patient. The best method of evaluating the completion of facial growth is by superimposing sequential cephalometric radiographs (KOKICH, 2001). Cephalometric radiographs taken one year apart should be compared and superimposed. If the vertical parameter from nasion to menton has not changed, it is likely that most of the facial growth has been completed.

It should also be remembered that facial changes occur throughout life. Although active facial growth may be considered to have been completed in the late teens or early twenties, continued facial maturation and changes, including in the vertical dimension, continue throughout

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EROSION - *this generation's challenge* PART 2

In the previous newsletter the problem of dental erosion was introduced and the importance of acidic drinks as one of the major causes was highlighted. These soft drinks and sports drinks have a devastating effect due to the phosphoric acid (food acid 338) they contain. The pH of these drinks is almost as low as stomach acid. In addition some of these drinks contain caffeine, a diuretic, which decreases the production of saliva which is needed for its buffering and remineralising capacity. Management of the problem primarily involves education of both patient and parent and listed here are some useful strategies:

- "Sports Drinks" should not be consumed during or for two hours after times of dehydration e.g. sports games. Only water should be consumed as the oral cavity is dry with no saliva buffers.
- Swish with water after "acid attack", or neutralise mouth by rinsing with sodium bicarbonate (1 teaspoon in a glass of water).
- Restrict acidic drinks to meal times when mastication stimulates saliva production. Finish the meal with cheese.
- Use a straw to minimise tooth surface contact. Do not hold acidic drinks in mouth or swish around before swallowing.
- Purchase soft drinks in a can, not a bottle, to discourage continual sipping as a lid can not be replaced on a can.
- Encourage label reading; the three main hidden acids are: citric acid (330), ascorbic acid (331), and orthophosphoric acid (338).
- Wait at least 20 minutes before brushing after any acid challenge.
- Encourage salivary flow by chewing sugar free gum. Frequent short duration chewing is better than continual chewing. Also crisp fruit and vegetables promote good saliva production.
- Drink more WATER, especially between meals.





the individual's life. (BEHRENTS, 1985) The effect that this long term continued facial maturation and change, perhaps over a period of 50 years or more, will have on the position and aesthetics of implant restorations is yet to be seen.

Implant Space Requirements

The space required for implant and crown replacement will be determined by a number of factors including the size and shape of the contralateral tooth, the size of adjacent and opposing teeth, aesthetics, the occlusion and by the size of the implant to be used.



For anterior aesthetics the "golden proportion" of 1:0.618 is often used to determine the ideal size of the upper anterior teeth. From the anterior view, the maxillary lateral incisor should be about two-thirds the width of the central incisor and the canine width should be about two-thirds the width of the lateral incisor.



In some situations the orthodontist may be forced to create more or less than the ideal space required for the implant due not only to the size of the teeth but also in order to establish optimal intercuspal relationships while providing a normal overjet and overbite. Options to be considered, in consultation with the restorative dentist or prosthodontist, are whether adjacent teeth need to be increased in width using adhesive restorations, veneers or crowns, or whether the width of the teeth needs to be reduced by interproximal stripping and crown recontouring.

The size of the space being provided for the implant can also be governed by the size of the implant that is to be used. The narrowest implants available today are 3.2mm in diameter. It has been noted that if space between the implant and adjacent roots is narrower than 1mm, there will likely be a reduction in bone height in that area over time (ESPOSITO, 1993; THILANDER, 1994). Current recommendations advise a separation of 1.5mm between root and implant. Therefore, allowing a margin for error, the minimum space required for an implant would be 6.5mm at the gingival margin which equates to slightly less at the proximal contact point.

Implant Site Development

The concept of "Orthodontic Implant Site Development" is quite new and not fully understood. For example if the maxillary permanent canine erupts adjacent to the central incisor when the lateral incisor is congenitally missing, orthodontic distalisation to create space for

implant replacement of the lateral incisor will provide an adequate and more stable alveolar ridge for the implant. "Orthodontic implant Site Development" can be undertaken in any part of the alveolar ridge where a tooth will be moved before implant placement. Studies have shown that if maxillary anterior teeth are extracted, the alveolar ridge will decrease in width by 34% over a 5-year period (CARLSON, 1967). Studies on congenitally missing mandibular premolars have indicated that the edentulous ridge decreases 25% within 3 years after primary molar extraction. This rate of decrease diminishes to 4% over the following 3 years. The age when the primary molar was extracted does not affect this change (OSTLER, 1994). However, if the edentulous alveolar ridge has been created by orthodontic separation of the teeth, little or at least much less resorptive change will occur over time. It is not yet understood why less alveolar ridge resorption is observed following orthodontic tooth separation.



Based on this information, it may for example be advantageous to allow the permanent canines to erupt mesially when maxillary lateral incisors are congenitally absent. However the benefits of this site development must be balanced with the potential for loss of arch length that can occur when canines erupt mesially.



There are several advantages in having an excellent ridge for implant placement, most notably the elimination of the need for bone or soft tissue grafting. Furthermore, immediate loading crowns can be placed eliminating the need for a removable appliance, reducing treatment time and resulting in a better aesthetic result. In cases where conventional 2-stage surgery is more appropriate, good ridge anatomy means that the surgeon can use a tissue punch, rather than a flap, to uncover the implant and the restorative dentist or prosthodontist can have the provisional crown ready to place on the implant on the day of exposure. Again, this improves the appearance of the soft tissue around the implant and leads to a more aesthetic implant restoration.

Conclusion

Implants have become an important part of contemporary orthodontic treatment planning and practice. Successful completion of the overall treatment requires comprehensive interdisciplinary assessment and consultation prior to commencement of treatment. Three of the factors that should be considered have been mentioned with further information about these and other factors available in the references supplied. Future editions of this newsletter will deal further with implants, particularly regarding the use of micro-implant anchorage and the treatment options for missing upper lateral incisors.

Brighter Futures is published by the Australian Society of Orthodontists (NSW Branch) Inc. in conjunction with the Orthodontic Discipline at the University of Sydney. Members of the Australian and New Zealand Academy of Prosthodontists are gratefully acknowledged in helping with the preparation of this newsletter.

The newsletter is intended to help keep the dental profession updated about contemporary orthodontics, and also to help foster co-operation within the dental team.

Without the generous support of Henry Schein Halas, 3M Unitek and Colgate, who are an integral part of the dental team, this publication would not be possible.

The statements made and opinions expressed in this publication are those of the authors and are not official policy of, and do not imply endorsement by, the ASO (NSW Branch) Inc or the Sponsors.

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