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Oral Rehabilitation of Severe Hypodontia Patients using Reconstructive Surgery and Implant Supported Prostheses

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Introduction

Severe hypodontia or oligodontia is defined as the absence of 6 or more teeth, with an estimated prevalence of between 0.1-0.2% in the general population.

Various treatment modalities may be utilised to manage these patients including the use of composite to reshape both retained primary teeth and permanent teeth, tooth supported fixed bridgework and conventional removable prosthodontics. However, effective treatment is likely to be complicated by small teeth of poor morphology and unfavourable skeletal and soft tissues patterns. Providing implant-retained restorations is also unlikely to be straightforward due to the lack of alveolar ridge height and width, often requiring bone augmentation. (Case 1a)

In this poster, clinical cases are used to illustrate the use of guided bone regeneration, sinus grafting, and block onlay grafts from the mental region and iliac crest to facilitate implant placement. Aspects of prosthodontic rehabilitation are also discussed.

Planning Phase

The restorative dentist should determine the ideal tooth positions considering aesthetics and function, so that dental implants are placed in optimal positions. Implant placement should not encroach upon the planned embrasure spaces and adequate inter-implant and implant-tooth distance provided to maintain alveolar bone and papilla levels. Implant position and angulations will also be affected by the decision to provide either a cemented or screw retained prosthesis.

Bone Augmentation

The lack of development of permanent teeth usually results in limited alveolar bone growth and there is often concavity of the alveolar process beyond the root apices of retained primary teeth, giving an "hour glass" ridge morphology in cross section.

Bone quantity and quality available in key areas should be assessed using cone beam CT with a radiographic stent in situ .

Mild-Moderate Horizontal Bone Defects

Guided bone regeneration at the time of implant placement can be highly predicable if only small changes in the bucco-lingual dimension of bone are required. In this situation the majority of the implant should be covered by bone and there should be good primary stability.

Moderate – Severe Horizontal Bone Defects with Minimal Vertical Gain

Block onlay grafts provide excellent structural stability and have the potential to act as a scaffold for the regeneration of the alveolar ridge. The use of intraoral donor sites, such as the mental symphysis and the mandibular ramus, has the advantage that surgery may be completed under LA. There is a limit to the amount of bone that can be harvested intra-orally and surgery can be associated with some morbidity including swelling, haemorrhage, infection and neural disturbance.(Case 1b)

Severe Horizontal and Vertical Defects

Augmentation using bone from extra oral donor sites, typically the iliac crest can be considered where large volumes of bone are required. This necessitates a general anaesthetic, in-patient management and involvement of the maxillofacial team. Surgery is associated with additional risk of morbidity including scarring, gait disturbance, infection, nerve injury and the risk of the general anaesthetic. (Case 2)

Iliac crest blocks can be sculpted to fit the recipient site, however, this bone has larger marrow spaces and seems to be more prone to resorption during the 3-6 month healing phase. It has been suggested that implants placed into sites augmented from the iliac crest have a higher failure rate compared to those placed into grafts from intraoral sites .

Maxillary Sinus Grafting

In the posterior maxilla there is often minimal bone height for implant placement due to the position of the maxillary sinus. This is a particular problem in hypodontia cases where both premolars are absent. Sinus grafting traditionally involves preparing a lateral bony window, elevating the sinus membrane and placing graft material beneath it. Implants placed following this have similar success rates to those placed conventionally .[3]The evidence suggests that alloplastic grafts are as effective as the use of autogenous bone , although healing times are longer in the former. (Case 1c). Alternatives include the use of shorter, wider implants (4mm wide by 6mm long).

Case 1a

Case 1b

Case 1c

Prosthodontic Rehabilitation

The use of fewer, moderate length implants in controlled positions to support sectional restorations, rather than full arch linked prostheses is advised. Where aesthetics allow, retrievable, screw retained restorations should be used in preference to cement retained [4]. This is especially important in young patients, who are likely to require the repair or replacement of the implant supra-structure at some point during their lifetimes. If any natural teeth are of limited prognosis, planning should take this into account so that the prosthetic arch can be extended if indicated.

Implant restorations should be designed to facilitate access for the patient's oral hygiene measures, examination of the peri-implant soft tissues and professional supra and sub-gingival debridement. Emergence profile of restorations should not be excessively bulky and pontic surfaces and interproximal contact areas should be easily cleansable. At times it may be necessary to accept a compromise in aesthetics to facilitate the long-term maintenance of peri-implant health. (Case 1d)

Case 1d

Case 2

Conclusion

With careful planning, patients with severe hypodontia can be rehabilitated very effectively in most cases achieving a good functional and aesthetic result. It should be highlighted that these patients will require ongoing follow up, maintenance and retreatment procedures over their lifetimes and prosthetic elements of treatment should be planned to facilitate this. If patients are appropriately selected and prostheses carefully designed and constructed, these restorations can be maintained within a General Dental Practice environment.

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