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Provision of a Swing Lock Denture for a Patient with Gorlin Goltz Syndrome

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Abstract - *Swinglock dentures are used relatively infrequently but in cases of compromised anatomy or where the pattern of tooth loss is unfavourable, they provide a useful removable partial denture design option. The aim of this article is to provide a clear summary of the clinical and technical considerations necessary when providing a Swinglock denture.*

KEYWORDS: Removable prosthodontics**,** Swinglock Denture**,** Gorlin-Goltz Syndrome

INTRODUCTION

In situations where patients have lost multiple teeth and the configuration of those remaining as well as the denture bearing anatomy are unfavourable, options for dental restoration are limited. The Swinglock denture (SLD), described by Simmons in the early 1960s [1] is a design of partial denture which may be relevant for a patient with a depleted dentition. The Swinglock design itself and the preformed components often used are a trademark of Swing-Lock® Inc., USA. They consist of a preformed metal hinge and locking precision attachment in a single casting [2], with labial bar that has multiple extensions. This type of denture design allows access to be gained to more tooth surfaces and undercuts for retention in comparison to a conventional partial denture using standard clasps and for this access to be achieved with ridged components. It is extremely useful where teeth remain only on one side of the arch. In this situation the retention or stability available for a conventional removable partial denture is less than ideal. Clasping the denture conventionally will not prevent rotation and displacement of the denture away from the denture bearing tissues. Additionally, it has been proposed that the swinglock design can be advantageous where teeth are periodontally compromised as it distributes forces more evenly among all remaining teeth. The SLD's indications (Table 1) and contraindications were established by Bolender and Becker [3].

CASE REPORT

There have been many reports over the years that demonstrate the successful use of SLDs to rehabilitate patients undergoing ablative surgery. In this case report we present a 60 year male, diagnosed with Gorlin-Goltz syndrome, referred by his General Dental Practitioner requiring the provision of a partial denture following ablative surgery.

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Gorlin-Goltz syndrome also known as Nevoid Basal Cell Carcinoma Syndrome (NBCCS) is a rare autosomal dominant hereditary disease. It was first described by Gorlin and Goltz in 1960 [4]. The main clinical features are: multiple basal cell carcinomas (BCCs), odontogenic keratocysts, skeletal abnormalities, hyperkeratosis of palms and soles, intracranial ectopic calcifications of the falx cerebri and facial dysmorphism [5].

The subject of this case study had experienced surgical enucleation of multiple recurrent odontogenic keratocysts in the maxilla. These lesions were the presenting feature of the syndrome, which was diagnosed at the age of 15. The necessary ablative surgery resulted in the loss of all of the teeth in the upper right quadrant, the upper left incisors as well as considerably altering the anatomy of the denture bearing area (Figure 1).

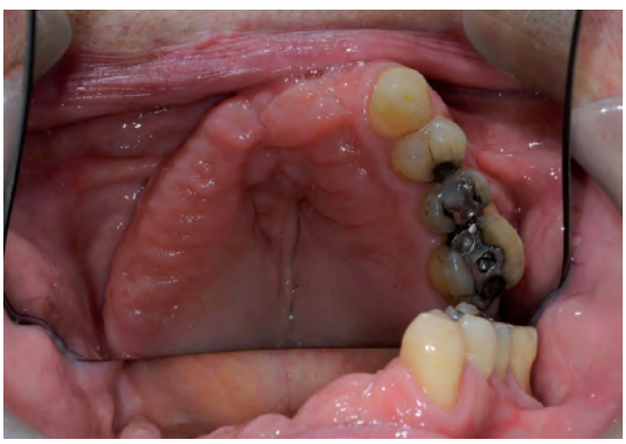
Provision of a removable appliance was considered challenging due to the altered denture bearing anatomy, described above. The features which would normally aid stability and retention, such as the tuberosity the alveolar ridge and depth of sulcus were all compromised. Additionally the unilateral loss of teeth created an unfavourable conventional clasping axis.

As a result of the anatomical changes and the pattern of tooth loss it was considered that the swinglock denture would be the most appropriate design. This framework design allows access to be gained to more tooth surfaces and undercuts enhancing retention, in comparison to a conventional partial denture using standard clasps. The use of non flexible components to engage these undercuts in particular helps to prevent rotation and displacement of the denture away from the denture bearing tissues.

The Swinglock design itself and the preformed components traditionally used are a trademark of Swing-Lock® Inc., USA. The design consists of a preformed metal hinge and locking precision attachment positioned at either end of a labial bar that has multiple extensions, engaging undercuts on the teeth. The framework is waxed up encompassing these preformed components and produced in a single casting [2].

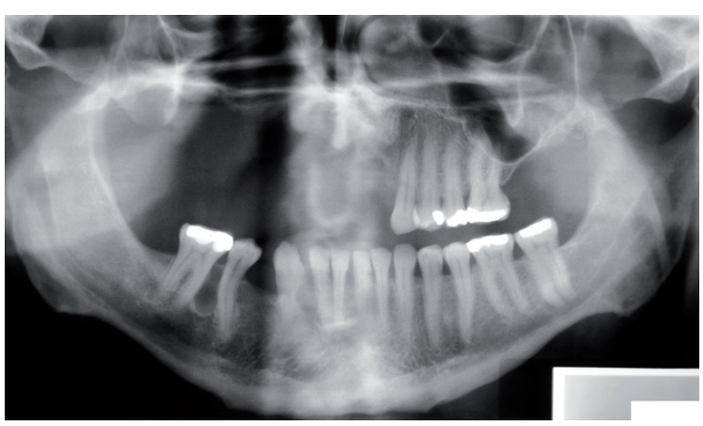
Table 1. *Indications for a Swinglock dentur*

Indications For A Swinglock Denture
Insufficient dental or alveolar undercuts to retain conventional removable partial dentures
Missing or weakened key abutment teeth
Poor tooth support due to pattern of tooth loss
Periodontal compromise of remaining teeth
Hemi-maxillectomy or mandibular resection



A.

B.



C.

Figure 1 *a) and b) Intraoral views showing pattern of tooth loss and associated loss of alveolar height and reduced sulcus depth. c) Radiograph showing lack of alveolar bone upper right maxilla and recurrent OKC between the LR5 and LR6, this was treated with local excision and curettage.*

Although at fit the denture was judged to be satisfactory in terms of retention and aesthetics, at review two weeks later, the patient reported that the clasp opened occasionally during function. The framework was carefully evaluated and it was considered that the position of the clasping mechanism could be improved. A second framework was produced with the clasping mechanism located so that it was more suitably placed to prevent release when subject to occlusal forces (Figure 3).

The final prosthesis is shown in situ in Figure 4.

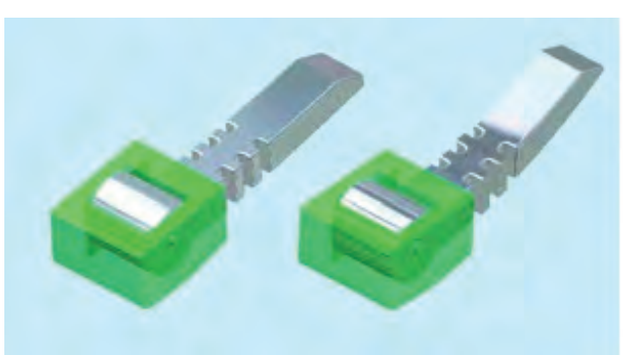
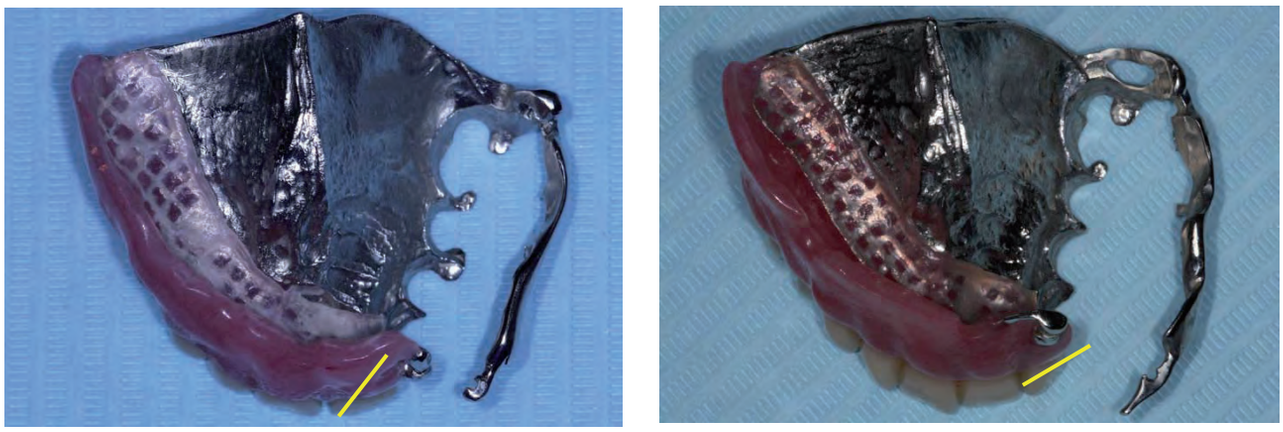


Figure 2. *Western hinge attachments* (Reproduced by kind permission of WDRScientific, LLC, USA.).



A. **B.**

Figure 3. *Positioning of the clasping mechanism to resist displacement during function, adjusted form its position on the first framework (a) to that on the second (b) to allow complete engagement on the mesial aspect.*

A. **B.**

C.

Figure 4. *Extra oral views showing aesthetics of denture and patient's low lip line. b) Intraoral views with denture in situ showing depth of buccal sulcus to accommodate bar mechanism and positioning of vertical struts engaging undercuts.*

Table 2. *Features for Swinglock Denture Success*

Clinical
Presence of a vestibule of at least 6-8mm in depth and the facility to capture the vestibule accurately [10]. Where there is less sulcal depth, it is impossible to accommodate the labial bar and additionally high fraenal attachments may be traumatised by the framework.
Good plaque control as SLDs tend to contact more tooth surface area than conventional prostheses
A low lip line to reduce the show of the labial bar which otherwise is likely compromise aesthetics. Acrylic labial veneering can be used as an alternative to metal struts if required.
Sufficient manual dexterity to allow opening and closing of the clasping mechanism.
Framework design
A bar spanning a minimum length of four teeth to ensure adequate flexibility [11].
Reciprocation achieved via a palatal plate that contacts all of the remaining teeth on or above the height of contour.
Direct retention supplied by small vertical struts (similar to I-bars in design) that leave the labial or buccal bar, traverse the marginal gingiva (with relief to avoid impingement), and contact the gingival third of the abutment teeth. The desired amount of undercut is 0.25 mm.
An arc of closure designed so that the bar closes and locks without interference from abutment teeth or soft tissues. This may mean shortening the bar by positioning the hinge mechanism in the sulcus above the teeth, rather than at the distal edge of the last standing tooth.
Careful positioning of the locking mechanism to resist displacement by the forces of occlusion.

DISCUSSION

The success of a swinglock denture requires appropriate case selection, an accurate impression of the functional anatomy of the arch and also careful design of the appliance. Although Swinglock dentures present an excellent option for treatment in compromised cases, they would not be suitable for many patients, particularly those with poor manual dexterity, aesthetic concerns, poor oral hygiene and those averse to wearing a removable appliance.

Partial dentures in general are known to have an adverse effect on the oral environment [6] and this may be even more of a problem with a Swinglock design, as the framework contacts more abutment teeth. However, studies assessing periodontal health during Swinglock wear have shown no significant periodontal deterioration [7, 8]. It still should be advised that patients be followed up regularly assessment and supportive periodontal care.

Key features to consider when prescribing this type of denture have been previously described [2, 3, 9] and are summarised in Table 2. In this modification case the way the clasping arm engaged made a significant difference to the function of the denture. It is essential to ensure that the arc of closure of the arm allows for complete engagement of the precision locking mechanism. Failure to do so results in the mechanism releasing when subject to occlusal forces. In this type of case where there is significant rotational force away from the edentulous area and therefore the position of the clasping mechanism is crucial.

CONCLUSION

The provision of Swinglock dentures may, if well designed, provide a successful alternative for the functional replacement of missing teeth, especially in cases of compromised anatomy or where the pattern of tooth loss is unfavourable.

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REFERENCES

1. Simmons, J.J. Swing-lock stabilization and retention. A preliminary clinical report. *Tex Dent J.*, 1963; **81**: 10–12.
2. Lynch CD, Allen PF. The swing-lock denture: its use in conventional removable partial denture prosthodontics. *Dent Update*. 2004;**31**(9):506-8. Epub 2004/12/23.
3. Bolender CL, Becker CM. Swinglock removable partial dentures: where and when. *J Prosthet Dent*. 1981;**45**(1):4-10. Epub 1981/01/01.
4. Gorlin RJ, Goltz RW. Multiple nevoid basal-cell epithelioma, jaw cysts and bifid rib. A syndrome. *The New England journal of medicine*. 1960;**262**:908-12. Epub 1960/05/05.
5. Kalogeropoulou C, Zampakis P, Kazantzi S, Kraniotis P, Mastronikolis NS. Gorlin-Goltz syndrome: incidental finding on routine ct scan following car accident. *Cases journal*. 2009;**2**:9087. Epub 2010/01/12.
6. Preshaw PM, Walls AW, Jakubovics NS, Moynihan PJ, Jepson NJ, Loewy Z. Association of removable partial denture use with oral and systemic health. *Journal of dentistry*. 2011;**39**(11):711-9. Epub 2011/09/20.
7. Schulte JK, Smith DE. Clinical evaluation of swinglock removable partial dentures. *J Prosthet Dent*. 1980;**44**(6):595-603. Epub 1980/12/01.
8. Gomes BC, Renner RP, Antos EW, Baer PN, Carlson M. A clinical study of the periodontal status of abutment teeth supporting swinglock removable partial dentures--a pilot study. *J Prosthet Dent*. 1981;**46**(1):7-13. Epub 1981/07/01.
9. Chan MF, Adams D, Brudvik JS. The swing-lock removable partial denture in clinical practice. *Dent Update*. 1998;**25**(2):80-4. Epub 1998/10/29.
10. Parr GR, Gardner LK. Swing-lock design considerations for obturator frameworks. J Prosthet Dent. 1995;**74**(5):503-11. Epub 1995/11/01.
11. Swing-lock imagineering: design and technique manual. Dallas, The Idea Development Co, 1969:9-10