CASE REPORT

Reactive dentures: a novel approach to decrease residual ridge resorption

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SUMMARY

The need for reduction of traumatic forces transmitted through the prosthesis has long been recognised and studies have shown that either a soft acrylic resin/silicone rubber can serve as a stress distributor and absorb some of the forces applied to the teeth. These dentures permit reaction to impacting forces which allows independent movement of one or more teeth in function unlike the conventional dentures. A completely edentulous patient with adequate inter-ridge distance was selected for the case, the dentures with soft liner placed between the patient's teeth and denture base were fabricated. This report presents a completely new technique to reduce the ridge resorption and facilitate patient comfort.

BACKGROUND

The forces of mastication are predominantly the impact forces that are applied to a tooth on a denture and are carried directly to the denture base and transmitted to the supporting tissues.¹ One of the main causes of resorption of denture-supporting structures is the traumatic force transmitted through the prosthesis;²⁻³ dentures with resilient liner in between teeth and denture base reduce these impact forces.

CASE PRESENTATION

A 55-year-old male patient reported with a history of loss of teeth over the last 2 months. His medical history was non-contributory. Clinical examination revealed completely edentulous maxillary and mandibular arches with adequate inter-ridge distance; therefore, this case was ideal to place a soft liner of 2 mm thickness in between teeth and denture base.

TREATMENT

Conventional procedures of primary impression, border molding followed by final impression and jaw relation were performed. Teeth arrangement was done except that a diastema of 0.5 mm was kept between each posterior tooth. Flasking and dewaxing were carried out to obtain stone moulds. Tin foil was used to make spacers of 2 mm thickness (figure 1) which were cut to the length and width of the posterior teeth.

Diatoric holes were placed in the posterior teeth (figure 2) and covered with the spacer. The mould was then packed with heat cure denture base resin (DPI, India) and allowed to stay in the hydraulic press for 20 min for initial polymerisation. After this, the flasks were reopened, the initially polymerised denture base resin was carefully separated (figure 3), spacers were removed and this space was

Figure 1 Two millimetre thickness of spacer.

packed with heat cured acrylic denture reliner (Supersoft, GC Company, USA) (figure 4) and then trial closed with initially set denture base resin. The flasks were kept in hydraulic press for bench curing after which they were kept for curing according to the manufacturer's instructions. The dentures were trimmed, finished and polished (figure 5). Finished dentures were then tried on patient for correct fitness (figures 6 and 7). After ensuring the correct fitness of dentures, the patient was educated about the usage and subsequent visit for follow-up.

OUTCOME AND FOLLOW-UP

After the first 4 weeks of follow-up, the results were found to be satisfactory, and currently the patient is under annual follow-up for the assessment of dentures in function and for comfort in mastication.

Figure 2 Diatoric holes in posterior teeth.

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Figure 3 Flask with spacer and initially polymerised denture base resin.

DISCUSSION

The periodontal ligament being resilient serves to cushion the impacting forces applied to natural teeth. The same principle can be used in dentures in which an elastic material can be imposed to absorb some of the forces imparted during function so that the trauma to the basal seat would be reduced and the forces would be more widely distributed over the basal seat.¹

In literature, authors have suggested different positions of placing the soft liner in the denture. Baker⁴ presented a report on an experimental denture in which a resilient material was placed in between the teeth and the denture base. These dentures permit occlusal reaction to impacting forces which allows independent movement of one or more teeth in function unlike the conventional denture. Parker¹ conducted a pilot study on the reduction of traumatic impact by sandwiching a resilient resin layer within denture base which acts as a shock absorber. The author suggested that since the area of the exposed surface is much smaller, less plasticiser may leach out of the resin.² In the present study, a soft liner was placed in between teeth and denture base.

Soft liners can be grouped as acrylic resin-based soft liners, silicone-based soft liners and treatment liners (tissue conditioners). The acrylic- and silicone-based soft liners are also available as heat-polymerised and auto -polymerised.

Figure 5 Denture with soft liner.

Failure of bond between polymethyl methacrylate (PMMA) and resilient lining materials has been a significant reason for the limited use of soft-lined dentures. One of the requirements of resilient denture liner is a satisfactory bond between the liner and the denture base.⁵ Hence, a soft denture liner that has excellent bonding strength towards PMMA denture base resin can be used most effectively. Soft denture lining materials that have a bond strength of 4.5 kg/cm² are acceptable for clinical use.⁶

Figure 6 Soft-lined denture— intraoral—left lateral.

Figure 4 Soft liner packed in place of denture base resin.

Figure 7 Soft-lined denture— intraoral—right lateral.

The final selection of the liner was based on ease of manipulation, adaptability and bonding with the denture base resin. In the present case, a heat-cured acrylic soft liner (Super Soft, GC Company, USA) was used.

Since 1 mm thickness seems to be a less to decide the action of liner and 3 mm seems to be more to incorporate as it decreases the strength of denture base¹ and also produces rubber ball effect, a 2 mm thick liner was selected.⁷ The patients with adequate interarch distance so as to place 2 mm thick liner were selected for this case.

The dentures of the patient in this study were functionally satisfactory. The patient reported that he could eat all types of daily food items with soft liner dentures. The patient reported that grinding was better with soft liner dentures; this could be because denture liners may affect force perception during mastication and also the lining material improves the occlusal balance by their deformation because of elasticity.⁸

Learning points

- ▶ Technique to reduce residual ridge resorption.
- ▶ Patient's comfort in wearing dentures.
- ▶ Increased mastication efficiency with dentures.
- ▶ Close mimicking of denture to natural dentition.

Contributors All authors have made substantive contribution to this manuscript, and all have reviewed the final paper prior to its submission.

Competing interests None.

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REFERENCES

- 1 Parker HM. Impact reduction in complete and partial dentures, a pilot study. *J Prosthet Dent* 1966;16:227–45.
- 2 El Charkawi HG. The effect of resilient layer and occlusal reactive complete dentures on the residual alveolar ridge. *J Prosthet Dent* 1988;59:598–602.
- 3 Murata H, Taguchi N, Hamada T, et al. Dynamic viscoelasticity of soft liners and masticatory function. *J Dent Res* 2002;81:123–8.
- 4 Baker CR. Occlusal reactive prosthodontics. *J Prosthet Dent* 1967;17:566–9.
- 5 Kutay O. Comparison of tensile and peel bond strengths of resilient liners. *J Prosthet Dent* 1994;71:525–31.
- 6 Kawano F, Dootz ER, Koran A, et al. Comparison of bond strength of six soft denture liners to denture base resin. *J Prosthet Dent* 1992;68:368–71.
- 7 Qudah S, Harrison A, Huggett R. Soft lining materials in prosthetic dentistry: a review. *Int J Prosthodont* 1990;3:477–83.
- 8 Darbar UR, Huggett R, Harrison A. Stress analysis techniques in complete denture. *J Dent* 1994;22:259–64.

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