

# SOFRELINER TOUGH S

Soft Denture Reline Material

## Clinical Report

### Application of Soft Lining Material to Dental Implant Treatment

Basic performance and clinical application of a long-term (and/or short-term) denture elastic lining material "SOFRELINER TOUGH® S(Soft)"

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### Introduction

Dental implant treatments need some time for mucosal healing and normal integration between the implant and bone (osseointegration) after implant placement. As part of this process, it is important to consider both improvement in the patient's quality of life and achieving the purpose of treatment.

In this paper, we introduce the clinical application of two different types of soft lining material for dentures, the use of which depends on the treatment stage of the dental implant.

### After implant placement, before suture removal

Immediately after placement of the implant, the sutured mucosa should not be overburdened. One way to reduce this burden is to create sufficient space between the denture and the mucosa. However, since problems that include food impaction and denture instability may occur, the space should be filled (in so far as possible) with a material which will not impose a burden on the injured mucosa. In such a situation, acrylic tissue-conditioning material, which is soft enough to deform plastically (Figure 1), is suitable for temporary use for 1 to 2 weeks after operation since it does not place an unnecessary burden on the mucosa. After about 1 week, the sutured mucosa will have healed and the sutures can be removed.

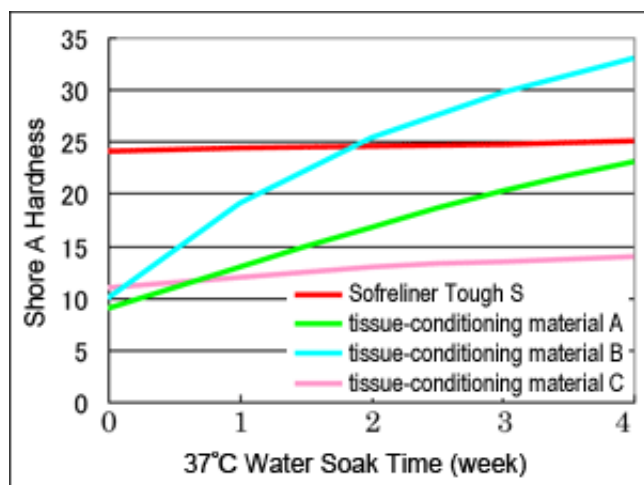


Figure 1 Change Term of Shore A Hardness (37° water solution) weeks

### After suture removal

After suture removal, 3 to 5 months are often needed until the secondary operation can be performed.

During this period, tissue-conditioning material is used, mainly for mucosal adjustment. However, tissue-conditioning materials become significantly harder and discolor over several weeks (Figures 1 and 2). Moreover, patients may be bothered by the smell. Therefore, relining is necessary after a short period of time. To address these problems, and for maintenance after implant placement, we tried a long-term (short-term) elastic lining material "SOFRELINER TOUGH S", (Figure 3 and 4) which has recently become available and is manufactured by Tokuyama Dental.

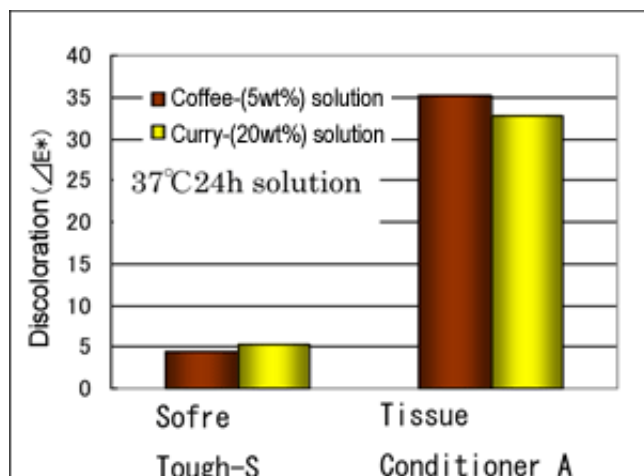


Figure 2 Discoloration Test (Coffee/Curry)



Figure 3 SOFRELINER TOUGH® S(Soft)

Paste (Base & Catalyst)	$\alpha,\omega$ -divinylpolydimethylsiloxane dimethyl hydrogen polysiloxane silica others
Adhesive Primer	ethyl acetate Adhesive polymer others

Figure 4 Composition of SOFRELINER TOUGH® S(Soft)

### Characteristics of SOFRELINER TOUGH® S(Soft)

SOFRELINER TOUGH® S(Soft) is a soft, silicone lining material, which is softer than "SOFRELINER TOUGH® M(medium)", also supplied by Tokuyama Dental. This material has the characteristics of both a long-term elastic lining material and short-term elastic lining material (tissue-conditioning material). This soft silicone material has a Shore A hardness of 24 and is chemically stable. When used it does not harden (Figure 1) nor does it become stained or discolored (Figure 2), separating itself from conventional materials. Furthermore, although it is soft, it has high mechanical strength (Figure 5) sufficient for long-term use of over 6 months.

#### Usage is as follows:

1. Grind the mucosal side of the denture to create a new surface.
2. Apply the adhesive primer to the mucosal side using a brush and allow it to dry completely.
3. Insert a mixing tip into the cartridge, dispense the paste onto the denture. This step takes 1 to 2 minutes.
4. The processing time for oral application is about 5 minutes.
5. Remove excess material after hardening has occurred, and polish the denture.

	Sofre TS	Sofre S	Sofre MS
Hardness* <sup>1</sup> (ShoreA)	24	23	43
Tear Strength* <sup>2</sup> (N/mm)	11	4	23

※1 complied with JIS K6253

※2 complied with JIS K6253 cross-head speed 500mm/min

### Clinical Case

A patient 57-year-old woman visited our dental clinic with the main complaint of esthetic disturbance of the upper front teeth. Informed consent was obtained for the treatment plan, which involved removal of a bridge over the upper right and left central and lateral incisors and extraction of the anchor teeth and the upper right canine due to a diagnosis of chronic marginal periodontitis. Implant treatment was then performed (Figure 6).

Since sufficient bone volume for implant placement was not observed in the right molar region on the study model, X-rays (Figure 6) and dental CT, bone augmentation and a sinus lift operation were performed as adjuvant treatment.



Figure 6 Pantomograph photo at the first medical examination

After the above auxiliary operation, it was necessary to protect the surface of the wound, and to obtain better denture retention. First the upper right molar region of the denture was ground using a low-speed rotating carbide bur on the surface. A tissue conditioning material was applied to the area for temporary lining and tissue conditioning. Figure 7 shows the mucosa of the upper right molar region 1 week after the tissue conditioning material was applied to the denture.. Since the affected area healed normally, sutures were removed.



Figure 7 After bone augmentation and sinus lift operation (1 week) in the right molar region

After suture removal, for the purpose of long-term maintenance, the tissue-conditioning material was removed and the mucosal side was refilled with SOFRELINER TOUGH® S(Soft), a newly marketed long-term (short-term) denture elastic lining material (Figures 8- a, b, c, and d).



Figure 8-a Grind the mucosal side with a carbide bur to expose a fresh surface.



Figure 8-b Applied a thin coat of the SOFRELINER TOUGH® S(Soft) Adhesive Primer



Figure 8-c Paste of SOFRELINER TOUGH® S(Soft) was applied.



Figure 8-d After intraoral pressure

Since sufficient bone volume was observed in the left molar region, implants were placed in the second premolar, first molar and second molar regions (Figure 9).



Figure 9 Implants were placed in the left molar region 5,6,7.

Figure 10 shows the sutured wound. Same as the right molar region, the affected area was protected with tissue-conditioning material in order to prevent a denture impression ulcer and deformation (Figures 11- a and b). Since the tissue-conditioning material has two colors, white and pink, for this case we used white to clearly identify the border.

One week after the primary implant operation, sutures were removed and the tissue-conditioning material was replaced with SOFRELINER TOUGH® S(Soft). Since patient acceptance of SOFRELINER TOUGH® S(Soft) has been good, we decided to use this material for long-term maintenance.



Figure 10 After placing implants, the area was sutured.



Figure 11-a Ground the upper left molar area 5,6,7 of the denture with a carbide bur.

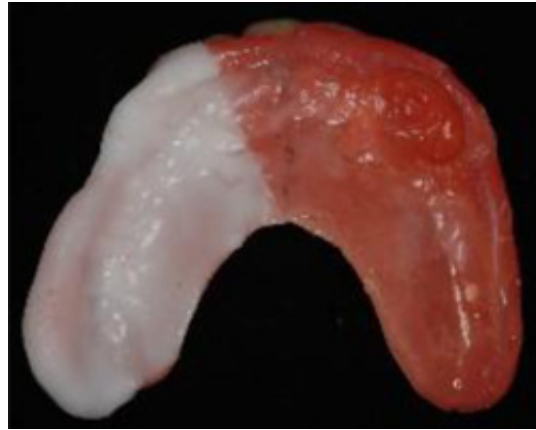


Figure 11-b Intraoral pressure with tissue conditioning material.

### Conclusion

As the use of dental implants has increased remarkably in recent years, general denture treatment has altered so that it can be performed in conjunction with dental implants. For long-term maintenance during implant treatment, soft lining material is applied to the mucosal side of the denture to protect the mucosa, absorb and spread occlusion pressure, and eliminate pain. Many soft lining materials have consequently been developed for clinical application. Among these materials, the newly developed SOFRELINER TOUGH® S(Soft) combines the characteristics of both short-term and long-term elastic lining materials, resulting in a dramatic improvement in long-term softness and prevention of discoloration. Consequently, this material is suitable for long-term use as well as maintenance after adjuvant, primary and secondary implant operations.