Aesthetic and functional restorations with Panasil impression materials

Dr Ugo Torquati Gritti
& Giancarlo Riva

A 70-year old female patient presented to our practice complaining of pain in the root of the upper canine. Clinical examination revealed no signs of fracture of the upper canine. The tooth was restored with a composite core material.

The patient was first referred to a specialist, who performed root canal treatment to eliminate the germs and their metabolites from the root canal. The tooth was restored using a ceramic post and a composite core material. The subsequent restoration had to be fulfilled to ensure optimal marginal fit, the temporary restoration, with contact points placed at the correct height.

Preparation of the tooth is very important for achieving this outcome. It is particularly important to determine the preparation margin, which must be clearly defined with a regular contour. These basic requirements must be fulfilled to ensure optimal application of the impression materials.

The type of preparation margin depends on the restorative material selected; in this case, the margin was prepared as a modified deep chamfer. Geometrically, this type of margin design is between an extended deep chamfer and a rounded shoulder.

The tooth was also prepared to a depth of 1 mm, which is essential for attaining a good result.

One of the most important requirements is the convergence angle between the two opposing axial walls. Some clinicians recommend an angle of 8°, which is difficult to achieve in clinical practice. Others recommend an angle of between 10° and 22°.

The interim or temporary stage is very important with aesthetic dental restorations, as it affects the function—temporary restorations have a positive psychological effect on the patient and are also useful in correctly simulating and planning the permanent restoration at an early stage. A temporary restoration is, therefore, not an insignificant aid; it has a key role in interdisciplinary dental treatment.

During this stage of treatment, we used a laboratory-fabricated temporary restoration, which was fabricated before preparation. The original shape was adjusted and corrected before waxing up the affected tooth on the dental stone model, which had been fabricated using an alginate pre-liminary impression. Following placement of an unsaturated retraction cord in the sulcus to ensure optimal marginal fit, the temporary restoration was re-lined. Once the contour of the cervical region had been established, the margins and all other areas of the temporary restoration were finished. Cementation was then completed using eugenol-free temporary cement. An ideal papilla contour can only be guaranteed by a precisely fabricated temporary restoration, with contact points placed at the correct height.

The papilla will remain fully intact, provided there is a distance of 5 mm between the contact point and the crest of the bone. This demonstrates the importance of the temporary restoration for preservation and regeneration of the gingiva following tooth preparation. New impression of the preparation must be taken with all the details once gingival growth is complete, which normally requires an average of three weeks (Fig. 1) to ensure stable, compact tissue. The preparation margin must first be exposed using a retraction cord before taking the impression.

Gingival retraction is of crucial importance when taking an impression of the preparation margin, as a fluid-free sulcus is essential for producing a good impression. Various gingival retraction techniques are used in clinical practice. The technique we used in this case consisted of mechanical-chemical retraction with a double cord. The retraction cords were placed with the aid of an applicator, whereby the first retraction cord (thickness 0), which was impregnated with an astringent 25% aluminium chloride solution, was placed below the preparation margin. The second, unsaturated retraction cord (thickness 0) was then placed stress free on the first cord (Fig. 2).

The gingival retraction technique has a significant impact on the influx of fluid into the sulcus during impression-taking. Pure cotton-wool retraction cords without a styptic agent are ineffective in preventing the influx of fluid into the sulcus. Successful isolation of the sulcus can only be achieved using chemical agents, while purely mechanical techniques using only cotton-wool retraction cords lead to increased formation of sulcus fluid.

The clinical success of a fixed restoration depends on a precise impression of all the details of the prepared tooth (Fig. 5). In summary, it can be stated that the accurate fit of crowns and fixed partial dentures depends on the impression. Inaccuracies during impression-taking can only be corrected with difficulty or not at all during the subsequent fabrication stages, which has an effect on the marginal adaptation of the restoration we fabricated.

The one-step putty-wash technique was used in this case.
for fabricating the restoration. It has been proven in vitro studies that impressions fabricated using this technique exhibit a higher detail definition than two-step putty-wash impressions.\textsuperscript{11,12} As the initial contact of the impression material with the oral mucosa is the critical moment clinically, we focused on a material that becomes hydrophilic with increased relative humidity and maintains its hydrophilicity throughout the entire working time. We therefore selected the impression materials Panasil tray soft and Panasil initial contact light (Kettenbach).\textsuperscript{13} Panasil initial contact light is impressive: the light material is used for optimally reproducing the details.

The flowability of the light material, viscosity of the tray soft and the pressure produced by the dispenser ensure that the impression materials flow uniformly onto the tooth surface, including intra-gingivally. Another characteristic of this material is that it is easily removed from the mouth, which may be a problem when using polyether materials. Thixotropic properties (positional stability) of Panasil initial contact light prevent the material flowing into the oral cavity when the impression tray is inserted into the oral cavity. The intra-oral working time of 1 minute and intra-oral setting time of 2 minutes and 50 seconds are very practice friendly. The combination of Panasil tray soft and Panasil initial contact light is impressive: the products ensure perfect reproduction of all details of the tooth in the impression (Figs. 8, 9 & 10).

Technical procedure

The most commonly used material for fabricating models is Class II dental stones, owing to their compatibility with all types of impression materials.\textsuperscript{14,15} The impression material must be inserted into the oral cavity when the impression tray is inserted into the oral cavity. The intra-oral working time of 1 minute and intra-oral setting time of 2 minutes and 50 seconds are very practice friendly. The combination of Panasil tray soft and Panasil initial contact light is impressive: the products ensure perfect reproduction of all details of the tooth in the impression (Figs. 8, 9 & 10).

Clinical finishing

Cementation is the final stage of prosthetic treatment. It should be noted that while the luting cement does not provide the dentist with the possibility of correcting inaccuracies in the restoration, it does contribute to clinical success. The luting cement influences the functional performance of a prosthodontic restoration; should the wrong cement be selected or used incorrectly, it can have an adverse effect on the service life of the crown. A high mechanical compressive strength is one of the most important properties.

As luting material is distributed in very thin layers, it must be capable of withstanding compressive loading in order to prevent fractures. We used glass ionomer cement that has not only a high compressive strength, but also the advantage of fluoride release. A comparative study of various cements established that the glass ionomer cement we used in this case produced the lowest film thickness of 20 µm.18 A follow-up examination was completed one week after permanent cementation to check the integration of the prosthodontic restoration into the tissue. The clinical procedure was completed with a further follow-up examination to check the occlusal relationship, which in most cases cannot be completed satisfactorily when fitting the restoration, owing to stress to the patient. The correct use of a temporary restoration and an adequate morphological design of the permanent restoration contributed to good adaptation of the incisor tooth papilla, as was established at intervals of 30, 60 and 90 days (Fig. 17).