Dr Eduardo Mahn
Chile

Over years, much has been said about the benefits and longevity of amalgam restorations. In contrast, direct composites have been stigmatised as inferior materials in the posterior area. With better aesthetics and adhesion to dental tissue, however, composites offer two indisputable advantages over amalgam.

The exact same thing holds true for indirect restorations. For years, it has been argued that indirect restorations made of alloys with a high gold content are the benchmark and that indirect ceramic restorations are inferior in terms of durability. Undoubtedly, this was the case with the first generation of these materials as proven by several studies; however, there have been enormous technological advances in the field of ceramic materials and adhesive cements. For example, ceramics that are more durable and have similar optical characteristics to lithium disilicate (IPS e.max System, Ivoclar Vivadent) have been developed. Resin cements have seen improvement with regard to adhesion to various dental materials, such as various glass-ceramics in combination with silane (Monobond-S, Ivoclar Vivadent) and metal and oxide ceramics in combination with a metal/zirconia primer. The self-etching Multilink N Primer A+B greatly simplifies the cementation process because it does not require the use of phosphoric acid. Simpler handling, universal application and improved resistance make it the most widely indicated cement for the posterior region as demonstrated in the case study below.

Case study
A classic restorative problem that we have to deal with almost every day is what to do after the removal of extensive and long-standing amalgam restorations. The original defect left by the retentive and aggressive preparation necessary for amalgam restorations, combined with the defective margins and caries adjacent to the restorations, means that generally only a minimal amount of useful dental tissue remains (Fig. 1).

During the removal of the amalgam, a rubber dam (Optra-Dam, Ivoclar Vivadent) should be used to allow better visibility and control, as well as to protect the patient from the amalgam powder generated during the procedure (Fig. 2). After removal of the restorations and any remaining caries, immediate dentine sealing was performed and a liquid resin was applied as a liner to fill the retentive areas left from the old dental hard tissue that would have been necessary for a crown (Fig. 3).

The excess cement was briefly cured for one to two seconds. The onlay was held close to the preparation while the luting composite was applied to the onlay and the preparation in order to ensure that the excess flows and bubbles were removed (Fig. 4).

Fig. 1: Defective amalgam restorations after several years in the mouth. Only a small proportion of dental tissue remains. - Fig. 2: For safer and more convenient removal of the restorations, the rubber dam should be used. - Fig. 3: Preparation after dentine sealing and application of a flowable composite as a liner. - Fig. 4a–b: Lithium disilicate onlays (IPS e.max Press, MDT Dieter Grübel). - Fig. 4c: Luting with hydrodynamic aid for one second. - Fig. 4d: Neutralisation with Monobond-S for two seconds. - Fig. 4e–f: Application of self-etching Multilink N Primer A+B. - Fig. 5: Application of self-etching Multilink N Primer A+B to the preparations. - Fig. 5: Cementsation. The onlay was held close to the preparation while the luting composite was applied to the onlay and the preparation in order to ensure that the excess flows and bubbles were removed. - Fig. 6: The excess cement was briefly cured for one to two seconds.

Aesthetic restorations in the posterior region
A case study demonstrating the adhesive cementation of ceramic onlays

De Eduardo Mahn
Chile

Over years, much has been said about the benefits and longevity of amalgam restorations. In contrast, direct composites have been stigmatised as inferior materials in the posterior area. With better aesthetics and adhesion to dental tissue, however, composites offer two indisputable advantages over amalgam.

The exact same thing holds true for indirect restorations. For years, it has been argued that indirect restorations made of alloys with a high gold content are the benchmark and that indirect ceramic restorations are inferior in terms of durability. Undoubtedly, this was the case with the first generation of these materials as proven by several studies; however, there have been enormous technological advances in the field of ceramic materials and adhesive cements. For example, ceramics that are more durable and have similar optical characteristics to lithium disilicate (IPS e.max System, Ivoclar Vivadent) have been developed. Resin cements have seen improvement with regard to adhesion to various dental materials, such as various glass-ceramics in combination with silane (Monobond-S, Ivoclar Vivadent) and metal and oxide ceramics in combination with a metal/zirconia primer. The self-etching Multilink N Primer A+B greatly simplifies the cementation process because it does not require the use of phosphoric acid. Simpler handling, universal application and improved resistance make it the most widely indicated cement for the posterior region as demonstrated in the case study below.

Case study
A classic restorative problem that we have to deal with almost every day is what to do after the removal of extensive and long-standing amalgam restorations. The original defect left by the retentive and aggressive preparation necessary for amalgam restorations, combined with the defective margins and caries adjacent to the restorations, means that generally only a minimal amount of useful dental tissue remains (Fig. 1).

During the removal of the amalgam, a rubber dam (Optra-Dam, Ivoclar Vivadent) should be used to allow better visibility and control, as well as to protect the patient from the amalgam powder generated during the procedure (Fig. 2). After removal of the restorations and any remaining caries, immediate dentine sealing was performed and a liquid resin was applied as a liner to fill the retentive areas left from the old
We subsequently took impressions and the laboratory fabricated lithium disilicate ceramic onlays (IPS e.max Press, Figs. 4a–b). In the next session, once the fit of the restorations had been checked in the mouth, we performed etching with hydrofluoric acid for 20 seconds and silanisation with Monobond-S for 60 seconds (Figs. 5 & 6). It is important to note that water is released in the chemical reaction of silanisation and, given the hydrophobic characteristics of the luting composite, this must be fully evaporated. The next step was to mix Multilink N Primer A+B and apply it to the preparations for 15 seconds (Fig. 7). The onlay was then held close to the cavity and Multilink N applied directly onto the onlay. This step is made easier by the auto-mix syringe containing the cement, which allows direct application to the restoration. It is important to remember that curing of Multilink N cement is accelerated on contact with Multilink N Primer A+B, which was previously mixed and placed in the cavity (Figs. 8a–c).

The cement was cured for two seconds to assist the removal of any excess, while pressure was maintained on the onlay (Fig. 9). The semi-plastic excess cement was easily removed with a curette and a daquette-type sharp instrument (Figs. 10a–c). Once the excess had been removed, the restoration margins were protected against oxygen with Liquid Strip (Ivoclar Vivadent). Then final curing was done (Fig. 11).

Figure 12 shows a view of the four onlays after cementation. The ceramic restorations were finally polished and the margins protected with Liquid Strip. The ceramic onlays blended seamlessly with the natural dentition owing to the aesthetic properties of the cement. The use of ceramic onlays in the posterior region is the treatment of choice in this type of treatment, in view of the durability they offer and the preservation of dental tissue made possible by adhesive cementation with materials such as Multilink N.

amalgam preparations (Fig. 1).

In the next session, once the fit of the restorations had been checked in the mouth, we performed etching with hydrofluoric acid for 20 seconds and silanisation with Monobond-S for 60 seconds (Figs. 5 & 6). It is important to note that water is released in the chemical reaction of silanisation and, given the hydrophobic characteristics of the luting composite, this must be fully evaporated. The next step was to mix Multilink N Primer A+B and apply it to the preparations for 15 seconds (Fig. 6).

The onlay was then held close to the cavity and Multilink N applied directly onto the onlay. This step is made easier by the auto-mix syringe containing the cement, which allows direct application to the restoration. It is important to remember that curing of Multilink N cement is accelerated on contact with Multilink N Primer A+B, which was previously mixed and placed in the cavity (Figs. 8a–c).

The cement was cured for two seconds to assist the removal of any excess, while pressure was maintained on the onlay (Fig. 9). The semi-plastic excess cement was easily removed with a curette and a daquette-type sharp instrument (Figs. 10a–c). Once the excess had been removed, the restoration margins were protected against oxygen with Liquid Strip (Ivoclar Vivadent). Then final curing was done (Fig. 11).

Figure 12 shows a view of the four onlays after cementation. The ceramic onlays after polishing of the margins can be seen in Figure 13. The ceramically restorations blended seamlessly with the natural dentition owing to the aesthetic properties of the cement. The use of ceramic onlays in the posterior region is the treatment of choice in this type of treatment, in view of the durability they offer and the preservation of dental tissue made possible by adhesive cementation with materials such as Multilink N.