ADHESIVE CEMENTATION IN ANTERIORS:

Cementation is a crucial step in the process of ensuring the retention, marginal seal and durability of indirect restorations. Cementing procedures are either adhesive or non-adhesive. Adhesive cementation involves the use of an agent to promote bonding of the restorative material to the substrate; it is a combination of adhesive chemical bonding and micromechanical interlocking. Non-adhesive cementation involves the use of a luting agent to fill the space between the restoration and the natural tooth and relies solely on micromechanical retention. The clinician must have a good understanding of metal alloys or ceramic type to determinate whether a restoration should be cemented adhesively or nonadhesively. Choosing and applying the appropriate surface treatment and cementation procedure will contribute to long-lasting restorations.

CEMENTATION OF GLASS CERAMICS RESTORATIONS

This ceramic is highly esthetic, biocompatible and resistant to abrasion and compressive forces. It must be cemented to the prepared tooth adhesively to increase the restoration’s resistance to fracture. Nonadhesive cementation is not indicated for feldspathic ceramic. The clinician must condition the glass feldspathic ceramics before performing adhesive cementation. The clinicians etches the ceramic internal surface with a solution of hydrofluoric acid (HF) 5% for approximately two minutes to increase surface area, micromechanical retention and to clean surface for adhesive cementation. Then the surface must be silanized. Adhesive cementation to enamel or dentine requires the use of an adhesive system, followed by application of a resin cement. Adhesive systems can be either self-etching or total etching. Resin cements can be cured via light, chemicals or a dual process combining the two. Light-polymerized resins are recommended when the ceramic is thin and fairy translucent. Dual-polymerized resin cements are indicated when the ceramic is too thick or too opaque to allow the light transmission.
Fig. 1

pre-operatory image of a veneer case

Fig. 2
Fig. 3  ceramic veneers in try-in stage

Fig. 4  acid etching
Fig. 5  silanization
**Fig. 6**  etch and rinse steps under rubber dam

**Fig. 7**  cement in place before polymerization
Fig. 8  before and after, look the profile change

Fig. 9  before and after, look the profile change
Fig. 10 before and after
TIPS & TRICKS

To pierce the dam in a multiple way without getting it dirty, we can use one as a template, place it on the one we must use and pierce both.
TRICKS: ..or we can use a new product which already has the image of the areas that have to be pierced on it.

CEMENTATION OF METAL RESTORATIONS

The cementation of metal or metal-ceramic restorations can be performed with conventional cements (zinc phosphate, glass ionomers, resin-modified glass ionomer) or with a chemical polymerization resin cement. In using chemical polymerization composite cements, base-metal alloys can increase adhesive bond to metal and metal-ceramic restorations due to the formation of a oxides layer capable of reacting with cement acid groups\textsuperscript{1-2}. Silanize the surfaces of silicate metal (Rocatec, 3M ESPE, St. Paul, Minnesota, USA; and Silicoater, Heraeus Kulzer, Hanau, Germany) can further improve the micromechanics interconnection and chemical covalent bonds \textsuperscript{3}. The adhesion that is reached is a micro-mechanical type and some surface treatment is generally required to increase the adhesive bond. However, the noble alloys offer a lower adhesion capacity compared to other materials, such as vile alloys.
Fig. 16  TIPS: it is often difficult to lute adhesive restorations with preps under the gum. The real trouble is the wet presence. We must avoid bleeding, so we need healthy tissues before cementation. Then we need to put always a retractor cord.
TIPS: it is often difficult to lute adhesive restorations with preps under the gum. The real trouble is the wet presence. We must avoid bleeding, so we need healthy tissues before cementation. Then we need to put always a retractor cord.

CEMENTATION OF ALUMINUM OXIDE CERAMICS

Adhesives protocols applied with success to the silica-based ceramics cannot be used for the aluminum oxide ceramics, because the etching with HF acid does not appear to increase the retention of resin cements. These ceramics can be cemented conventionally rather than adhesively. Long-term adhesion studies recommend blasting (with particles of Al2O3 from 30-50 Âµm at 2.8-3 atm) to roughen the surface for micromechanics adhesion. Coating the ceramic with tribochemical silica and the air abrading of intaglio surface, followed by application of 10-methacryloyloxydecyl dihydrogen phosphate before using resin cement (chemical or dual cured resin cement), improve the bond to this type of ceramic.

CEMENTATION OF ZIRCONIA CERAMICS

Zirconium oxide ceramics are characterized by the absence of glass in their composition. These ceramics possess high toughness and strength. Polycrystalline ceramics most often are cemented conventionally but can benefit from adhesive cementation. The use of low-pressure air abrasion with aluminum oxide particles or tribochemical silica application followed by application of an adhesion-promoting agent increase the bond-strength of resin cements (chemical or dual cured resin cement).

It is imperative that the clinician achieve affective isolation to keep the field free of saliva and other contaminants when using adhesive cements. Field isolation in not required in the case of zinc-phosphate and glass-ionomer cementation, but it’s necessary the fluid and saliva control.
CEMENTATION OF COMPOSITES

The bond between composite restoration and resin cements is very high and allows to have good levels of adhesion. So we can reach a very good adhesion even with indirect restorations. To have it one of the most effective protocols is that one that provides sandblasting the inner surface of the restoration with aluminum oxide for about 10 seconds, silanization (possibly activation with hot air or in special ovens of the silane), drying, then the application of a layer of bonding resin and at the end the luting procedures with a resin material that could be a dual composite cement or composite photo-polymerizable (generally pre-heated in a special oven) 17-18.
TIPS: EVEN CROWS CAN BE LUTED UNDER THE DAM. USE JUST AN IVORY HOOK, FOR ANTHEROS # 9, 9T OR 212 ARE THE BEST. CONTROL TO SEE ALL THE PREP PERIMETER UNDER THE DAM ISOLATION. NOTE: DENTINE IS SANDBLASTED WITH GLICINE POWDER TO POLISH IT AND TO INCREASE ADHESIVE PROPERTIES.
TRICK: WITH COMPOSITE ANTERIOR INDIRECT RESTORATIONS WE CAN EASILY USE A HEATED COMPOSITE TO LUTE, BECAUSE OF ITS PHYSICAL PROPERTIES IT’S THE BEST WAY TO DO IT. 55Â° IN A SPECIAL OVEN FOR 20 MINUTES. WITH CERAMICS IT’S BETTER A DUAL CURED ONE BECAUSE OF THEIR OPACITY.
Fig. 23  TIPS: NOT TO INCLUDE AIR BUBBLES WE MUST PUSH THE RESTORATION WITH DELICATE PRESSURE AND JUST ONE MOVEMENT UNTIL ITS TOTALLY SEATED.
TIPS: WHEN POSSIBLE, IDS (IMMEDIATE DENTINE SEALING) IS A MUST! EVERYTIME WE CAN USE A RUBBER DAM WE HAVE TO DO IT. HOW? WITH AN ETCH AND RINSE SYSTEM OR WITH AN ETCH AND DRY ONE. JUST RESPECTING THE RIGHT PROTOCOLS (SEE CLINIC MEETS RESEARCH VOL. ONE ADHESION – LINK http://styleitaliano.hime.host/clinic-meets-research-1/)
TIPS: WE ALWAYS HAVE THE NEED TO SANDBLAST THE INNER SURFACE OF THE COMPOSITE RESTORATIONS AND SOMETIMES WE MUST USE ALUMINUN OXIDE (50 MICRONS) TO SANDBLAST THE BUILD UP. WHEN WE HAVE OLD COMPOSITE AS SUBSTRATE FOR THE ADHESION FOR EXAMPLE.

CONCLUSIONS:

We have to use dual cements when the restoration is not easily penetrable by the halogen light. Among the dual cements those who do not self-polymerize of in less than 6 minutes are preferred: this in order to reduce any problems done from the shrinkage of composites.

We can use light-cured composites when the artifact is easily crossable by halogen light and it is of adequate thickness (over 7-800 micron).

In the end we could us flowable composites when the restoration is easily crossable by halogen light but is very thin (less than 7-800 micron). 19-20-21.