

1

Overview: rehabilitation of natural teeth



An **indirect restoration** requires taking an impression and employing a dental laboratory to fabricate the prosthesis. Conversely, a **direct restoration** is carried out chairside, usually in a single visit, without using a dental laboratory. Indirect dental prostheses can either be **intracoronal** or **extracoronal**.

Indirect intracoronal prostheses

Intracoronal prostheses are defined as those **surrounded** by one or more natural tooth surface(s). This categorisation is broadly based on **Black's cavity classification**:

- **Class I:** lesions of pits and fissures of all teeth, predominantly in premolars and molars
- **Class II:** lesions on the proximal (mesial or distal) surfaces of posterior teeth, and the restorative cavities are referred to as MO (mesial-occlusal), DO (disto-occlusal) and MOD (mesial-occlusal-distal)
- **Class III:** lesion in the anterior teeth, similar to a class II lesion, the class III lesion typically appears at the contact areas
- **Class IV:** the class IV lesion is a class III lesion, including the incisal corner of an anterior tooth
- **Class V:** typically occurs at the cervical margins on the buccal or lingual aspect of any tooth
- **Class VI:** not originally in Black's classification, but has become accepted as an additional lesion that occurs on the tips and cusps of posterior teeth, or along the biting surfaces of the incisors due to wear (tooth surface loss –TSL)

Three developments have made Black's cavity classification redundant. First, research has elucidated biological mechanisms such as **demineralisation/reminerisation** and the role of fluoride ion, and therefore, removal of infected and affected dentine is no longer a prerequisite. Second, new restorative materials such as **resin-based adhesives and filling materials**, and therapeutic filling materials, which are both bacteriostatic and bactericidal, avoid removing vast amounts of tooth. Third, improved and sophisticated techniques such as **adhesive protocols** allow restorations of small lesions, preventing progression to larger cavities. These advances preserve more of the natural tooth, and the current use of Black's classification is a notation, rather than as a basis for restoring decay. Whereas, in the past, **cavity design** was **geometric** (dictated by the restorative material), it is now **amorphous** (dictated by the extent of disease).

Smaller lesions are restored by a direct approach, while larger Class II or Class IV may also be restored indirectly with inlays or onlays (extracoronal), when a direct approach is judged as mechanically or aesthetically inferior. Inlays and onlays are fabricated in a dental laboratory using a variety of materials including composite resins, ceramics and cast gold alloys.

Indirect extracoronal prostheses

Extracoronal prostheses are defined as those **surrounding** one or more natural tooth surface(s). The indications for extracoronal restorations are:

- Restoring **structurally compromised** teeth
- **Improving function** (e.g. altering vertical dimension of occlusion – VDO or occlusal vertical dimension – OVD)
- **Improving aesthetics** (e.g. anterior maxillary and mandibular sextant)
- **Abutments** for a fixed-partial denture (FPD)

Extracoronal prostheses are categorised as:

- **Inlays and onlays** – the difference between an inlay and an onlay is the extent of tooth loss requiring replacement. Broadly speaking, an inlay '**fits into**' the tooth, while an onlay incorporates cuspal coverage and '**fits onto**' the tooth
- **Porcelain laminate veneers (PLV)** – the principal use of PLVs is improving anterior aesthetics by altering tooth morphology and colour. PLVs are the least invasive of extracoronal restorations, usually involving the buccal surfaces of anterior teeth. If the underlying tooth colour is acceptable, only minimal tooth reduction is necessary (0.3–0.8 mm) for improving contours and colour with a thin porcelain laminate fabricated in a dental laboratory. PLVs are the most prescribed type of restoration for purely cosmetic reasons. However, it should be remembered that preparing vital healthy teeth for PLVs with little aesthetic improvement is contentious, especially if similar results are achievable with less invasive protocols such as **bleaching** or **resin-based composite (RBC)** fillings
- **Partial coverage crowns** – partial coverage crowns are an extension of PLVs. They occupy a midpoint between full coverage and the minimally invasive PLV. Many configurations are possible, e.g. $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, etc. The rationale for partial coverage is retaining as much natural tooth substrate as possible, and hence preserving pulpal and structural integrity
- **Full coverage crowns and fixed partial dentures (FPD)** or bridges – a full coverage, 360° crown is indicated for severely broken-down teeth, abutments for FPDs or rarely for elective aesthetic treatment. Various materials are used for fabricating crowns depending on the clinical scenario, e.g. cast metal, metal-ceramic, all-ceramic, composite and acrylic. For vital teeth, a crown can be supported either by coronal dentine or a core build-up. For endodontically treated teeth, a **post and core complex** may be necessary. **Intraradicular posts** are available in many materials, designs, configurations and sizes. A core can be fabricated directly using amalgam or composite, or indirectly using cast metals or ceramics. The sole purpose of a post-and-core complex is supporting the eventual extracoronal crown. **Posts and cores do not reinforce or strengthen teeth**, but weaken an already compromised root and the remaining coronal dentine. A **ferrule effect** is highly desirable for cores, either with or without posts
- **Combination prostheses** – depending on the extent of the clinical requirements, any intracoronal and extracoronal restoration can be combined into a single entity, e.g. inlay + onlay or PLV + inlay (veneering).

Key points

- A direct restoration is carried out chairside, while an indirect restoration requires using a dental laboratory.
- Black's classification is useful for describing the site of a lesion.
- Intracoronal restorations are surrounded by tooth surface(s).
- Extracoronal restorations surround tooth surface(s).
- Inlays are examples of intracoronal prostheses.
- Onlays, PLVs and crowns are examples of extracoronal prostheses