Annotation to the lesson №18

**Topic:** Preparation of cavities for inlays

**Inlay** - microprosthesis (fixed) used for the restoration of damaged part of the tooth crown.

**Methods of inlays' manufacturing:**

1. prosthetic;
   - direct;
   - indirect.
2. therapeutic:
   - direct (Cerec);
   - direct (from composite and ceramite).

**Material for inlays:**

1. metal: cobalt-chromium alloy, Au-Ag-Cu;
2. Ceramic or porcelain;
3. Photopolymers, compomers.

**ADA classification.**

1- inlay - inlay for 1st and 2nd Black type cavities on the condition that at least one natural cusp has been preserved;
2- onlay- microprosthesis that completely covers the occlusal surface of the tooth up to the equator;
3- overlay - microprosthesis that completely covers the crown of the tooth except for one surface;
4- pinlay - inlay with a pin.

**Classification by Curlyandskiy V.N.:**

1- all cavities on one surface of the tooth;
2- all cavities on two surfaces;
3- all cavities on all three or more surfaces;

**Bajanov classification (1960)**
O, M, D – occlusal, medial, distal surfaces of the tooth;
OD and MO - medial-occlusal and occlusal-distal surfaces;
MOD - medial-occlusal-distal.

**Inlays by their purposes:**
1. restoration inlays;
2. supporting inlays;
3. splinting or distributing (beam splint).

**Direct method of inlay manufacture**

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**Basic principles for the formation of cavities for inlays:**

Unlike fillings, inlays are manufactured by laboratory method with subsequent fittings and fixation in the preformed cavity with fixation materials. In this regard, the rules of formation of cavities for inlays differ from the methods of preparation of teeth for fillings.

Basic principles for the formation of cavities for inlays:

The cavity is formed considering the route of administration and outputting of the inlay.
- Prophylactic expansion of the cavity for the prevention of caries recurrence.
- Ensuring of strength of the walls and the bottom of the cavity to chewing pressure.
- Cavity formed for the inlay should be located in the dentin of the tooth and have sufficient depth within the safety zones.
- A bevel (bevel of enamel prisms) is crated within the operational bed enamel.
- Cavity formed for the inlay should be asymmetric.

The route of administration and outputting of the inlay depends on the topography of the cavity. If the cavities are located on the occlusal or proximal
surfaces of posterior teeth, as well as in the case of Black class IV, route of administration and removal of the inlay should coincide with the longitudinal axis of the tooth (vertical route of inlay administration). If the cavity is located on the proximal surface of the tooth (III class by Black), in fissures of the frontal teeth or in the cervical portion of the tooth, the route of the inlay administration should be perpendicular to the longitudinal axis of the tooth (horizontal route of inlay administration).

During the opening of the cavity and excision of the softened dentin, it is necessary to conduct thorough preventive expansion within healthy tissues. In this case particular attention should be paid to the observance of safety zones (areas within which an operator can confidently excise dental hard tissue without fear of opening its pulp chamber).

To ensure the resistance of the inlay to the chewing pressure, the cavity bottom is formed flat and perpendicular to the vertical axis of the tooth. A convex bottom is formed in the cervical region cavities (V class by Black). Cavities on the contact surfaces of the posterior teeth are formed with a stepped bottom.

From the viewpoint of redistribution of chewing pressure and stability of the inlay, the cavity walls are made parallel to each other and are perpendicular to the bottom. However, when dealing with deep cavities, inlay fixation can be complicated by the difficulties for free cement release from under the inlay. In case of deep cavities, divergence of walls in the range of 3 to 12 degrees is allowed. Classic "box-like" cavity comprises formation of right angles between the walls and the bottom of the cavity. In this case there is a possibility of stress concentration which may result in a breakage of the wall, especially in the cases, when it is thinned. It is acceptable to form cavity walls with a smooth transition to the bottom without corners. An obligatory condition of processing of teeth walls during the formation of the cavities for inlays is application of cutting rotating dental tools, which vertical dimensions of the working part are greater than the depth of the cavity formed in the tooth.

In case of crown defects of the II class by Black, an additional dovetail-like cavity is formed on the occlusal surface. This cavity provides redistribution of the angular component of the chewing pressure directed towards the missing wall. Formation of the cavity ends by the creation of a bevel along its edge to the depth of the enamel layer. Due to the presence of the bevel the inlay covers the cut enamel prisms and prevents their fracture. It also excludes presence of "saped" enamel prisms deprived of nutrition and dentine support. The enamel prisms bevel angle is 45 degrees.