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## Matches, clips, needles, or pins

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**A**ccurate duplication of prepared teeth and maintaining their relationship to one another are important in constructing fixed partial prostheses. Proper retraction of the soft tissues and careful impression making will help in recording the detail of the preparation. An accurate working cast with removable dies is essential to make a well-fitting restoration.

The process of developing a working cast with removable dies may be made quite complex or extremely simple. Devices are available to hold dowel pins parallel to each other. They require special impression-holding tables and are quite helpful in positioning the dowel pins. One of the simplest methods is to mark the border of the impression in relation to the preparation and to place the dowel pin into the soft die stone after making the first pour of the impression. However, this technique has certain disadvantages. The position of the dowel pin is more difficult to align with relation to the facial or lingual margins of the preparation. Greater difficulties are gauging the depth of the dowel pins in the die stone and insuring parallelism when preparations are adjacent to each other. A removable stone die is stronger when the head of the dowel pin is positioned within the confines of the preparation itself. Achieving this position by the "eyeball" technique is uncertain and also may cause the head of the pin to impinge on a margin or a flexible portion of the impression.

It is evident that dowel pins must be positioned and stabilized before pouring the die material. The dowel pins must be held in position with the head inside the preparation portion of the impression. Many simple but effective methods have been used before pouring the impression. These include use of needles and pins, paper clips, bobby pins, wax wafers, and matches.

### NEEDLES AND PINS

For a long time, anesthetic needles and straight pins have been used in positioning and stabilizing dowel pins (Fig. 1). They are pushed through the impression material from the facial surface, above the region of the preparation, to the lingual or palatal surface. Two needles, one positioned mesially and one distally, are used

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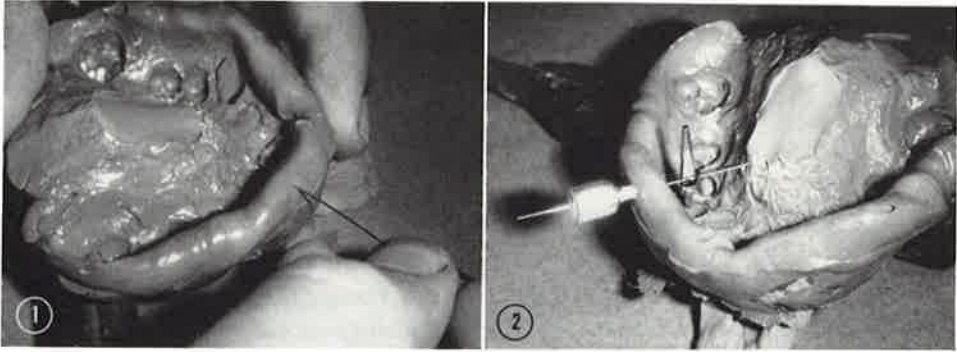


Fig. 1. A disposable anesthetic needle is inserted through the rubber base impression.

Fig. 2. A dowel pin is positioned over the preparation.

for each prepared tooth. The flat surface of the dowel pin is placed against one of the needles and held in position with sticky wax (Figs. 2 and 3). Two needles (Fig. 3) are needed to prevent rotation of the dowel pin during the vibrations encountered when the die material is poured (Fig. 4). Straight pins can be used instead of anesthetic needles, but the pins are thicker in diameter and shorter in length. A major risk is encountered while pushing "pin stabilizers" through an impression. There is the possibility of pulling and distorting the impression, especially if the "stabilizers" must pass close to the preparation area (Fig. 5).

#### PAPER CLIPS

Paper clips have varied uses for positioning dowel pins. Generally, the paper clips are attached to the facial and lingual aspects of the impression above the preparation. The clip may be opened in a mesial-distal dimension, or left unopened, with a dowel pin attached in place. If attached to only one wire, the dowel pin may rotate. Another disadvantage of paper clips exists when the dowels are placed between the opened clip under spring tension. In both examples, if the sticky wax seal is broken during the vibration process, the dowel pin loses its position in the preparation.

#### BOBBY PINS

The flat surface of the dowel may be placed against the flat surface of the bobby pin, within one of the corrugated spaces close to the opening end of the pin. Disadvantages in using bobby pins are similar to those of paper clips. In addition to the possibility of dislodgement if the wax seal is broken, the bobby pins are difficult to position. When a dowel is placed in one of the corrugations, the positioning of the remaining system is limited. Paralleling multiple dowels often means placing the dowel pins at various angles within the bobby pins, and this can create additional spring tension.

#### WAX WAFERS

Wax wafers or strips, usually made of baseplate wax, may be used to stabilize dowels. A 5 mm. wide wax strip is cut from a sheet of baseplate wax. The brass

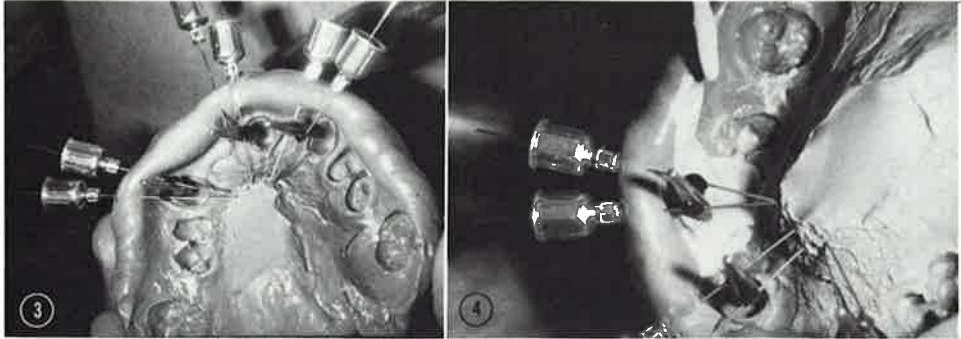


Fig. 3. A second stabilizing needle maintains the position of the dowel pin.

Fig. 4. Die stone is carefully added and vibrated gently to eliminate bubbles.

dowel pin may be warmed and centered in the wax strip, which is then attached to the impression over the preparation. Wax strips may distort or bend during the pouring of the impression. This method has not found favor with many dental laboratory technicians.

## MATCHES

The paper match is one of the simplest and most effective methods for placing dowel pins in their proper position before pouring the impression. The technique is extremely simple. One match is used for each dowel pin. With a sharp instrument such as a scalpel blade, the match is split open from the side (Fig. 6). One-half turn of the blade is usually sufficient for opening the match. The tail of the dowel pin is then placed in the match and taken to the impression. The match and dowel pin are positioned in the proper manner over the preparation in the impression (Fig. 7). When the pin is made parallel to the long axis of the preparation and to the other dowel pins, it is attached to the match with hot, sticky wax (Fig. 8). Sticky wax is pulled along side the dowel pins and into the fibers of the match by capillary action. This prevents the dowel pin from rotating within the match and also maintains its position with relation to the preparation. It is advisable to attach the dowel pin to the match away from the impression once the positioning of the pin has been determined (Fig. 8). The ends of the match are now sealed to the impression with sticky wax. Multiple dowel pins may be placed rapidly and effectively using paper matches as stabilizers (Fig. 9). When attaching is done with sticky wax, care must be exercised not to drop the hot wax into the impression of the preparation.

Small pontic areas often create a problem of retention when making the second pour of working casts. The residual ridge, if narrow, is difficult to fix to the base of the cast. In this situation, it is advantageous to place a dowel pin and make the edentulous ridge a removable section of the cast. Matches are useful in positioning the dowel pins over these edentulous spaces (Fig. 10).

After the dowel pins are sealed in position, a preferred die material is mixed to the manufacturer's specifications. The material is carefully placed on the side of the impression. When there is little access, such as in an impression of the lower anterior teeth, the stone may be applied to the dowel pin in the area of the match and allowed

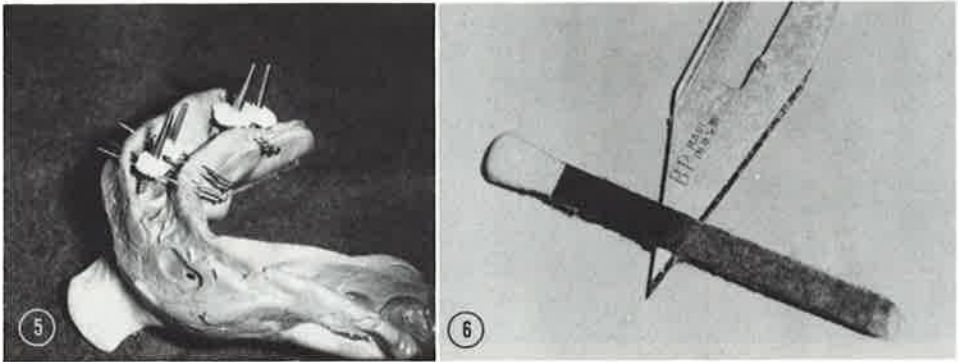


Fig. 5. Straight pins and modeling clay are used to position the dowel pins.

Fig. 6. A scalpel blade is used to open a cardboard match.

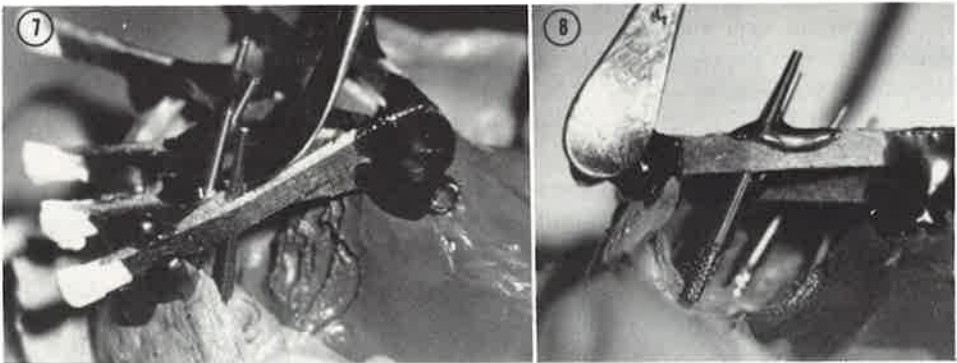


Fig. 7. Sticky wax is applied to the match and dowel pin.

Fig. 8. Sticky wax is added to the border of the impression to strengthen the position of the match and dowel pin.

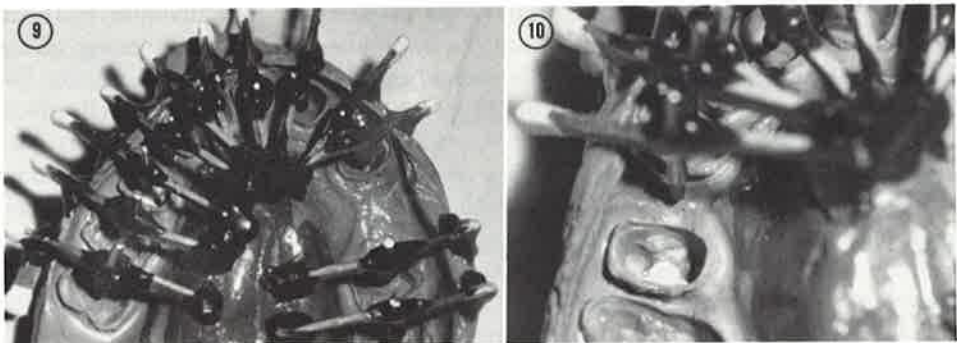


Fig. 9. The dowel pins are positioned. The impression is ready for the first pouring of stone.

Fig. 10. A dowel pin is placed over a small edentulous space. This portion of the edentulous ridge may be removed later from the working cast.

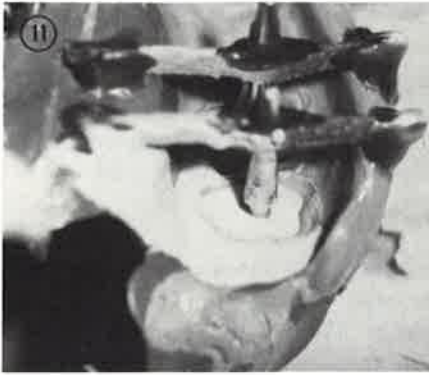


Fig. 11. The die stone application should begin at one end of the impression. The stone is vibrated and flows from one preparation impression to the next.

Fig. 12. The cast is completed and sectioned.

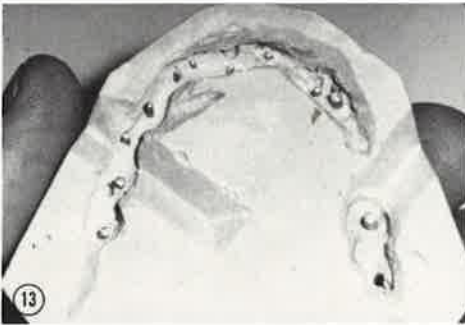


Fig. 13. Relief is provided by the wax connecting the ends of the dowel pins.

Fig. 14. Dies are easily removed from the second pour of stone.

to flow down the dowel into the impression. When this method is used, only very small amounts of die stone are applied to the dowel pin. Larger quantities of stone may entrap air in the small apices of the preparations (Fig. 11).

When all the preparation areas of the impression are filled with die stone, additional stone is added to the pour to give the removable dies a heavier base (Fig. 12). Maximum length of the dowel pin should be maintained for stability of the die. Too much stone will reduce the length of the dowel pin and thus sacrifice stability.

After the first pour of the impression sets, the matches and sticky wax are removed from the dowel pins and the impression. Additional indexing for stability or retention may be provided at this time. Semispherical indentations made with a large round bur will work well as indices. A suitable separating medium is applied to the die stone, and a second pour of a dental stone is applied to form the base.

It is wise to indicate the position of the dowel pins within the second pour. This may be accomplished by adding wax or modeling clay to the tips of the dowel pins. When the second pour is just beginning to set, a sharp knife will uncover the wax or clay which may then be removed (Fig. 13). When the base is hard, the impression is

removed and the cast trimmed. The dies are cut and removed from the base (Fig. 14).

Matches will hold the dowel pins in position with most impression materials. However, the moisture present in hydrocolloid impression material prevents sticky wax from holding the matches in position. Therefore, when using hydrocolloid impression materials, other methods for positioning dowel pins should be used.

### SUMMARY

Several methods for positioning dowel pins used in the fabrication of removable dies have been presented. Needles, pins, paper clips, hairpins, and matches are all useful in positioning dowel pins in the impression. The use of paper matches is a simple and effective method for holding the dowel pin in the proper relation while the die stone portion of the cast is being poured.

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