The Van der Linden Retainer

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The introduction of bonding has made it possible to attain more precise results in active orthodontic treatment than when bands were used. For instance, interdental spaces do not have to be closed after debonding, and more optimal contact points and tooth positions can be obtained. Therefore, a retainer may no longer need to move teeth, but only to maintain them in their proper positions.

Concepts of Retention

The posterior teeth are stabilized by occlusal contacts, mainly during swallowing. Under normal functional conditions, retention is needed only for the anterior teeth. For that purpose, a bite plate is usually preferred for the maxillary anterior teeth and a bonded lingual wire for the mandibular arch.

An advantage of a removable retainer over a bonded retention wire is the less frequent occurrence of unnoticed tooth displacements. In general, a patient does not become aware of a loose spot on a bonded retainer that is attached to more than two teeth, and usually does not report to the office until a notable migration has

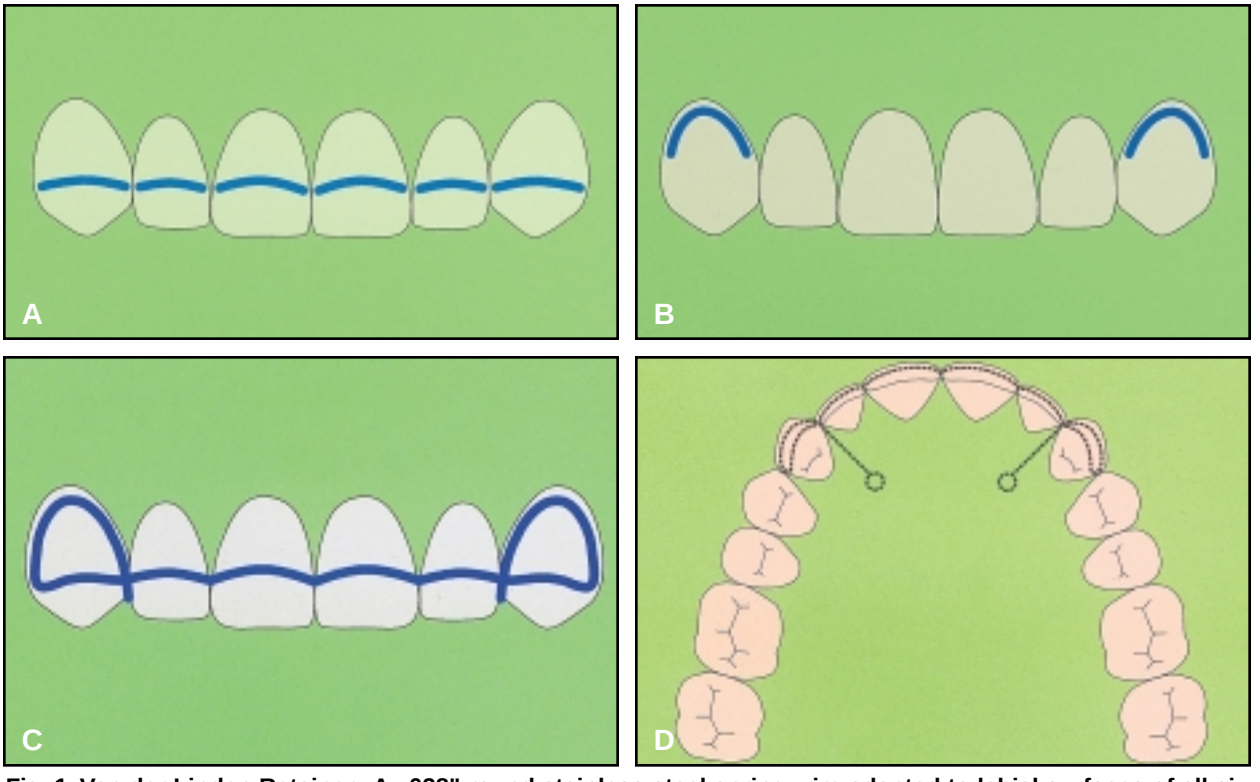

Fig. 1 Van der Linden Retainer. A. .028" round stainless steel spring wire adapted to labial surfaces of all six anterior teeth. B. Clasps at canines stabilize labial wire and acrylic plate. C. Closed loops are considerably more rigid than open loops, adding rigidity to anterior section. D. Cervical sections of wire at canines provide clasp function; incisally located sections stabilize canines against rotation.

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occurred. A removable maxillary retainer, fabricated as shown in this article, offers considerable security. It has the additional advantages that it does not hinder oral hygiene and that its wear can be reduced gradually.

Design of the Van der Linden Retainer

The Van der Linden Retainer is constructed to offer complete control over the maxillary anterior teeth, with firm fixation provided by clasps on the canines (Fig. 1). The continuous .028" labial arch and left and right three-quarter .032" molar clasps are embedded in the palatal acrylic plate (Fig. 2). The premolars and molars should be free of acrylic, except where there are clasps (Fig. 3).

This retainer does not usually interfere with the occlusion, because most maxillary lateral incisors have rounded disto-incisal corners with sufficient space for the retainer wire on the palatal side. Nevertheless, the patient's occlusion should be checked to ensure that an .028" wire can pass between the lateral incisor and canine without causing interference. If not, sufficient space is usually available distal to the canine (Fig. 4).

Use of the Retainer

For full freedom of the occlusion, and to allow the surrounding musculature and tissues to arrive at their proper balanced positions, the premolars and molars should not be contacted by wires or acrylic. A removable retainer with acrylic contacting the posterior teeth will not maintain functionally determined positions. Furthermore, if such an appliance is worn during sleeping hours only, the posterior teeth will be forced back to unnatural positions every time the plate is inserted.

Patient cooperation with the prescribed wear of a removable appliance such as a retainer depends partly on the associated discomfort. Therefore, a retention plate should be as thin as possible, except where the mandibular anterior

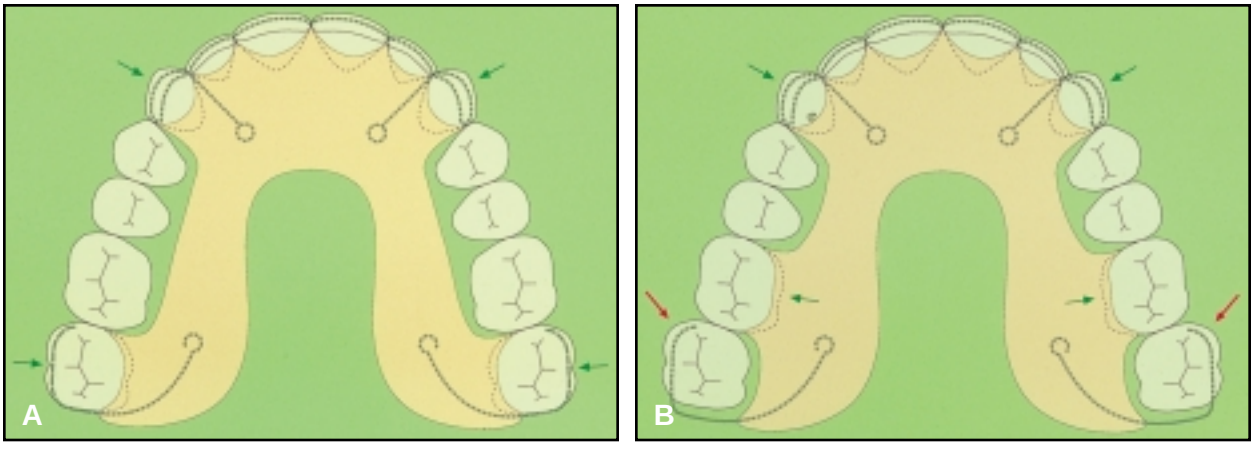

Fig. 2 A. Acrylic contacts palatal surfaces of molars with three-quarter clasps; all other posterior teeth must be free of acrylic. B. To move mesially and buccally located second molars into desired positions with three-quarter clasps, acrylic should contact first molars, but not second molars.

teeth are supported vertically. The more the palate is kept free, the less patient discomfort. Biting on acrylic, and particularly on metal parts, is a disturbing sensation. Most important is the complete adaptation of the archwire to the labial surfaces of the anterior teeth and of the clasps to the canines. These aspects should be checked carefully when the retainer is inserted for the first time and at every subsequent visit (Fig. 5).

Generally, a retention plate should not be used to move an anterior tooth, as control over the adjacent teeth will be lost. A retention plate

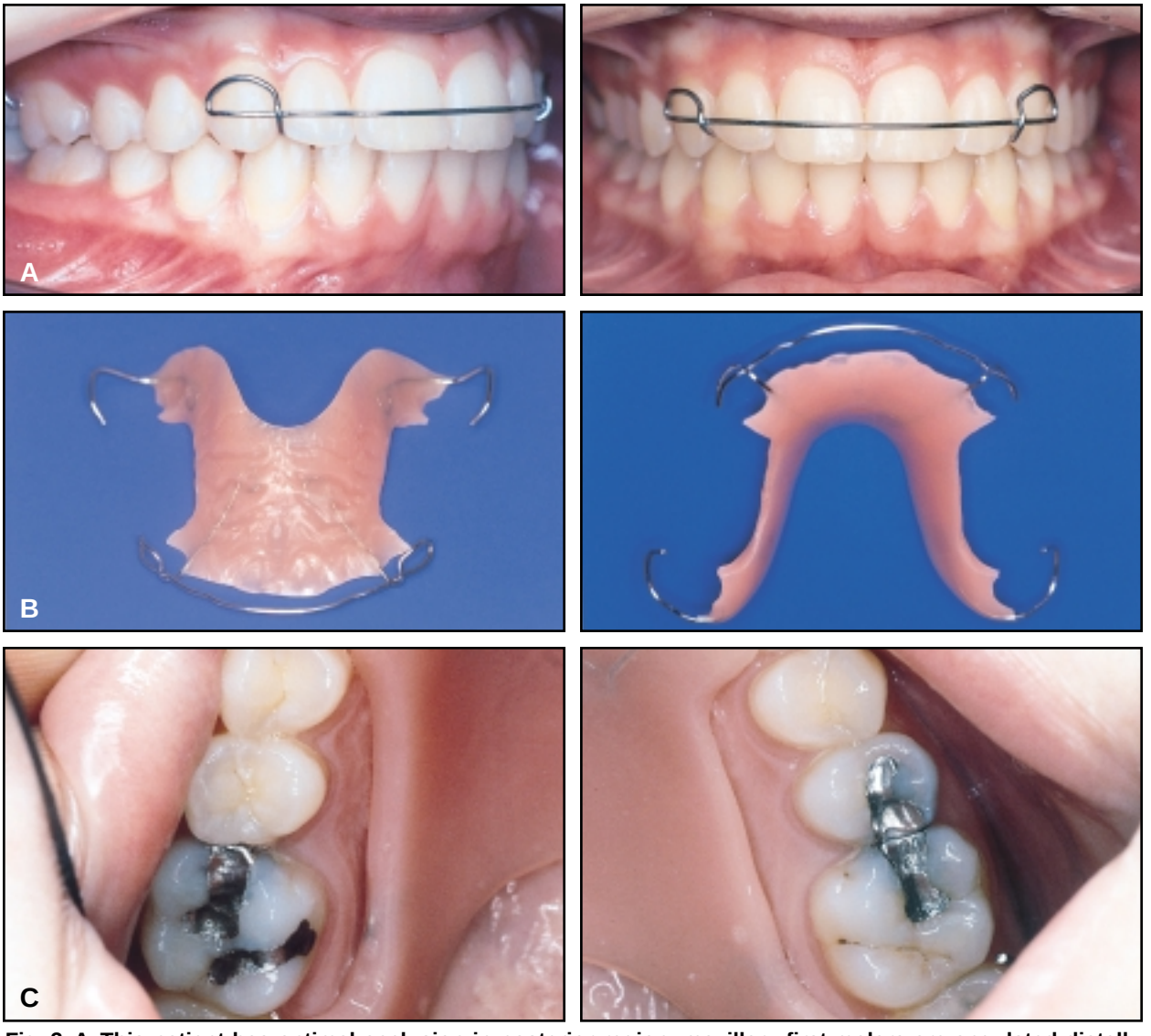

Fig. 3 A. This patient has optimal occlusion in posterior region: maxillary first molars are angulated distally and intercuspate fully with opposing teeth. Placing clasps distal to first molars would interfere with occlusion. B. Acrylic plate should be as thin as possible, only partially covering palate. C. Posterior teeth should be mostly free of acrylic to avoid food traps.

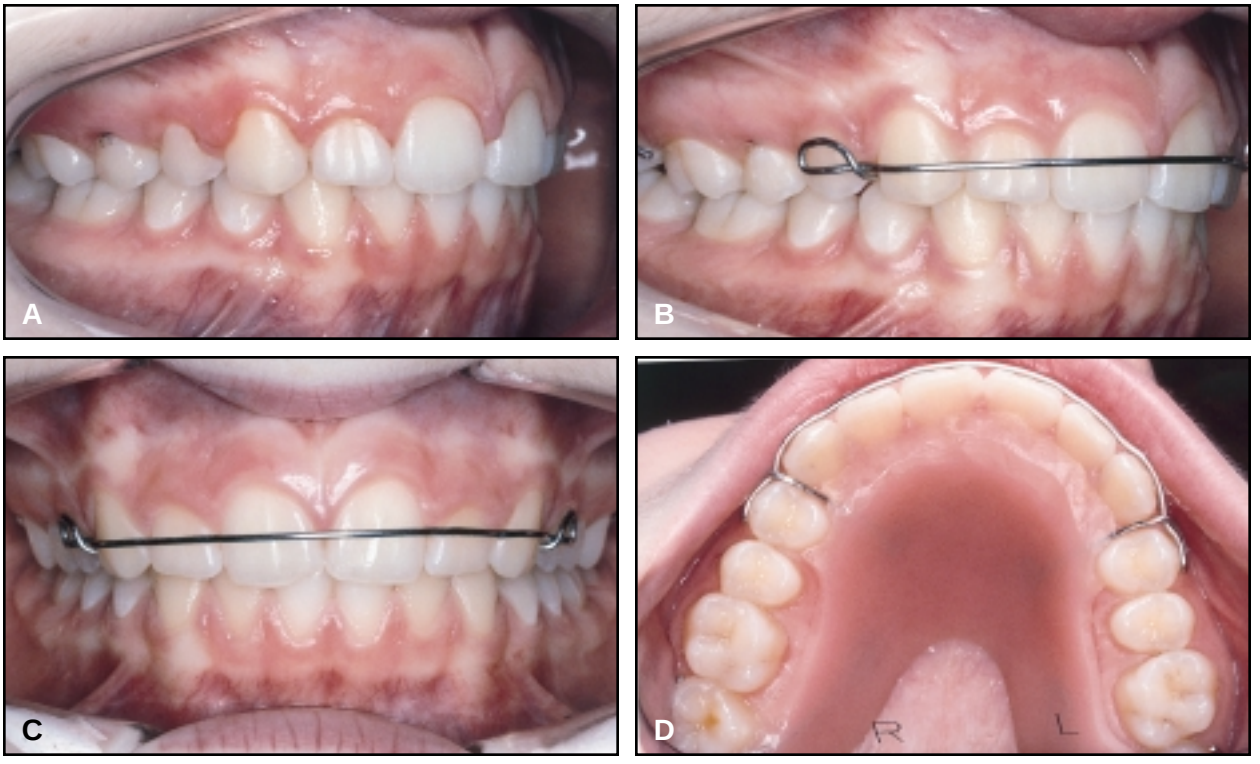

Fig. 4 A. Morphology of lateral incisors in this patient does not allow wire to cross mesial to canines without interfering with occlusion. B. Wire can cross distal to canines. C. Disadvantage is longer labial bow. D. Premolars, particularly second premolars with their shorter crowns, are less suited for clasp function than canines; note acrylic contacting palatal surfaces of premolars.

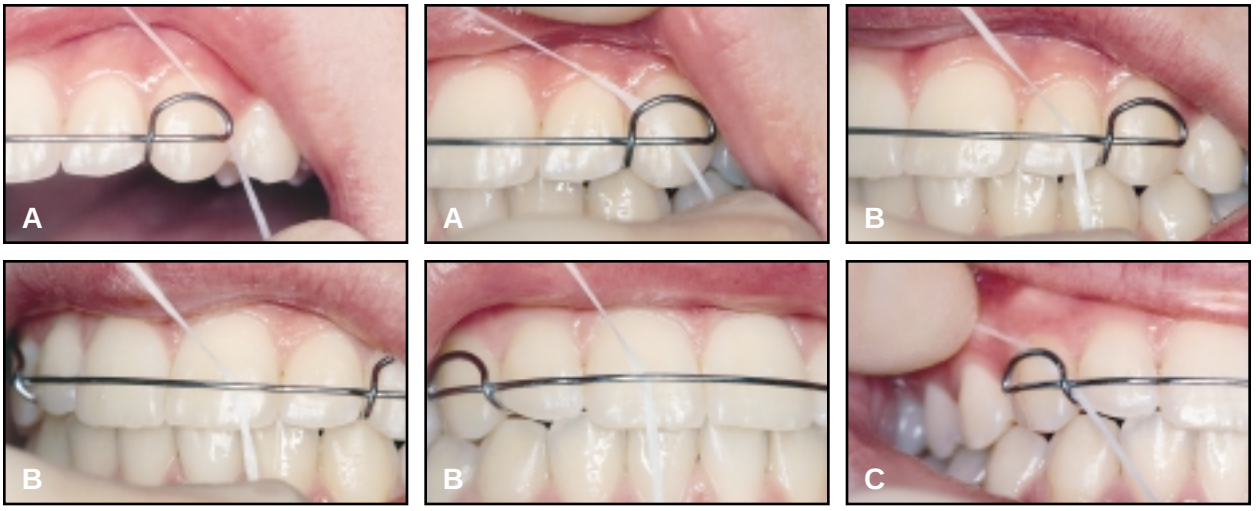

Fig. 5 Pulling floss between retainer wire and teeth shows whether wire makes proper contact and how much force it exerts. A. Clasp checked at left canine. B. Labial bow checked from lateral incisor to lateral incisor. C. Clasp checked at right canine.

should have a rigid labial arch that does not distort during normal use. The design advocated here fulfills that requirement.

A patient who handles this appliance with care does not need to return for check-ups more than once a year. Even then, the labial bow usually requires little adaptation. After four to six months, retainer wear can be reduced to sleeping hours. When used as described above, this retainer can serve well for many years (Fig. 6).

Instant Corrections

Minor corrections are often required after removal of fixed appliances. Fortunately, the wide periodontal spaces present at the end of active treatment allow immediate tooth movements to be performed (Fig. 7). Slightly malpositioned teeth can be quickly corrected if the retainer is placed as soon as possible after the active appliances have been removed (Fig. 8).

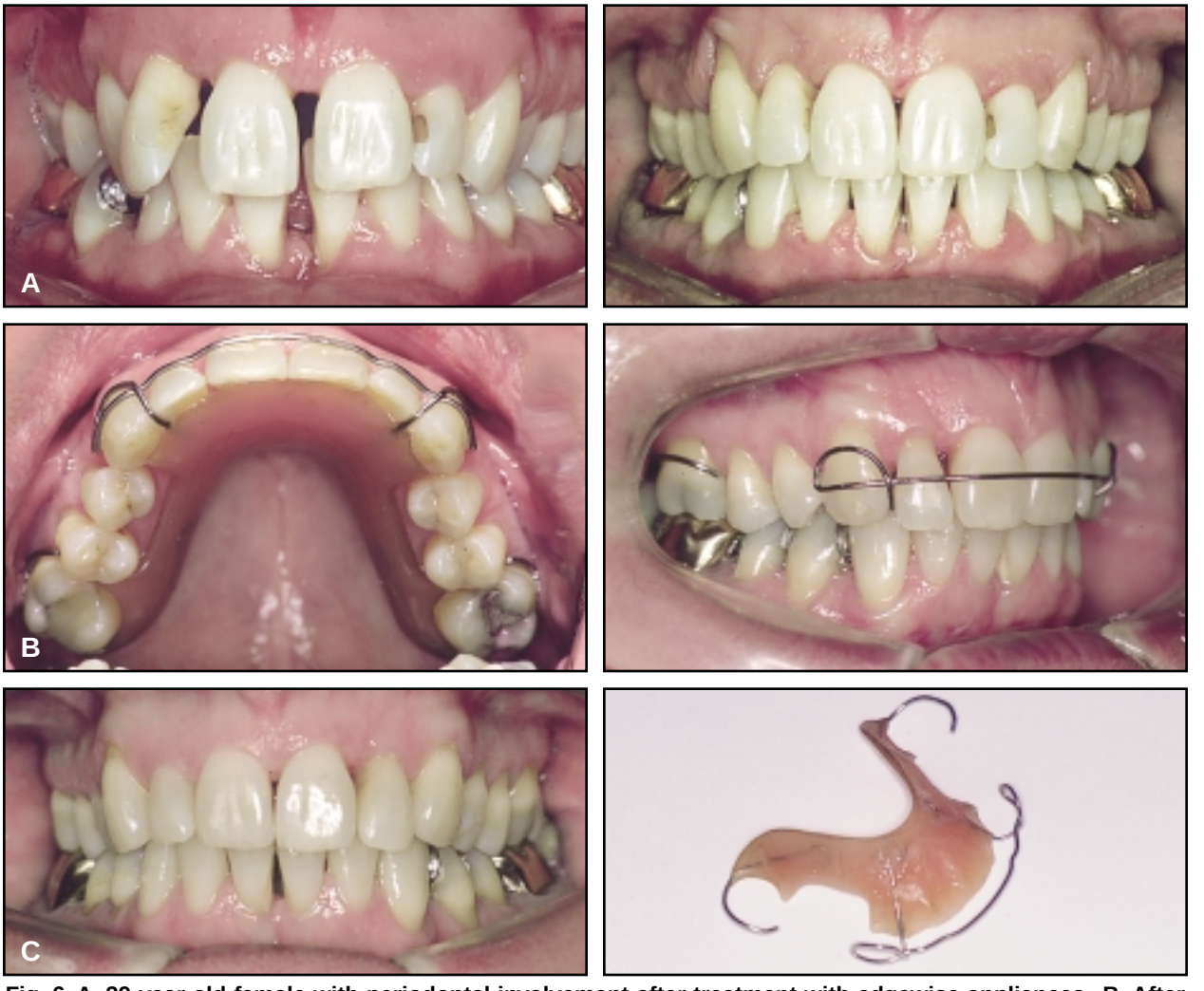

Fig. 6 A. 39-year-old female with periodontal involvement after treatment with edgewise appliances. B. After placement of mandibular bonded 3-3 retainer and maxillary Van der Linden Retainer. C. After 10 years of wear, tooth positions have not changed noticeably, and retainer still fits well.

If needed, the Van der Linden Retainer is fabricated with built-in tooth displacements. When palatal movement is required, a groove is made to seat the wire deeper on the working cast, and the palatal surface of the tooth to be moved is relieved of acrylic (Fig. 9). When labial movement is required, plaster is removed from the palatal side of the tooth to be moved so the acrylic will provide pressure, and the labial bow is adapted so it will not contact that tooth.

When maxillary second permanent molars are not banded, they may tend to erupt too far mesially and buccally. These molars can be moved into correct positions with the three-quarter clasps of the retainer (Fig. 10). The acrylic is maintained at the first molars, but removed at the second molars. Once the second molars have attained the desired positions, the acrylic is built up against their palatal surfaces and removed at the first molars.

Fig. 7 Maxillary incisors immediately after removal of fixed appliances, showing wide periodontal spaces.

Disadvantages

The Van der Linden Retainer has two shortcomings. First, it does not retain changes in mesiodistal angulation. If such retention is needed, a thin, bonded twisted-wire retainer should be considered. Occasionally, a combination of the

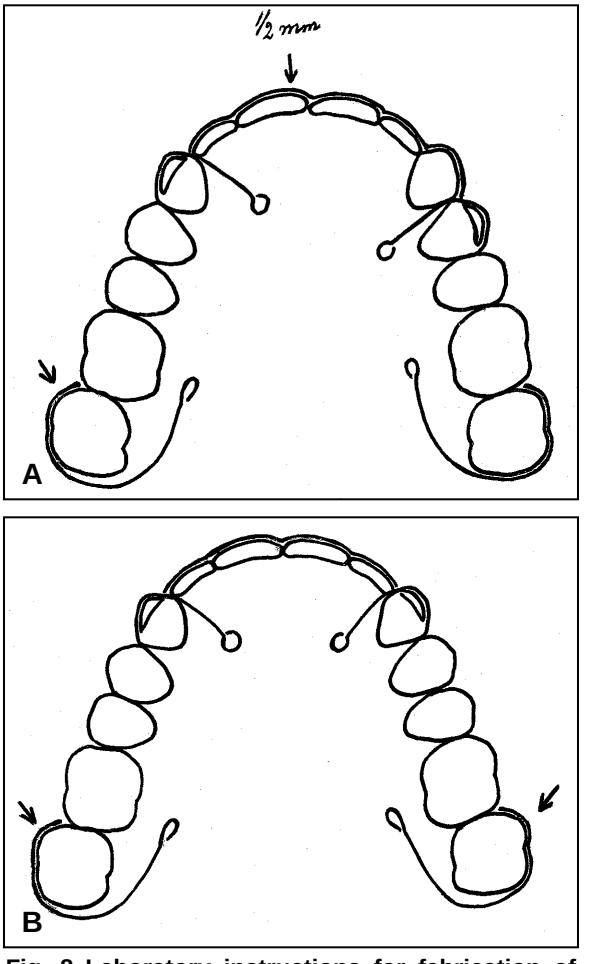

Fig. 8 Laboratory instructions for fabrication of Van der Linden Retainers. A. By indicating which teeth need to be moved, desired corrections can be built in. B. For displacement of maxillary second molars, sufficient space should be left for distal and palatal movement.

two retainers is a good solution.

The other drawback is that extrusive movements of the incisors are not restrained, so that a maxillary lateral incisor that has been extruded in treatment can move back between the acrylic and the wire. Placing a small composite ridge on the tooth cervical to the labial bow can prevent this movement.

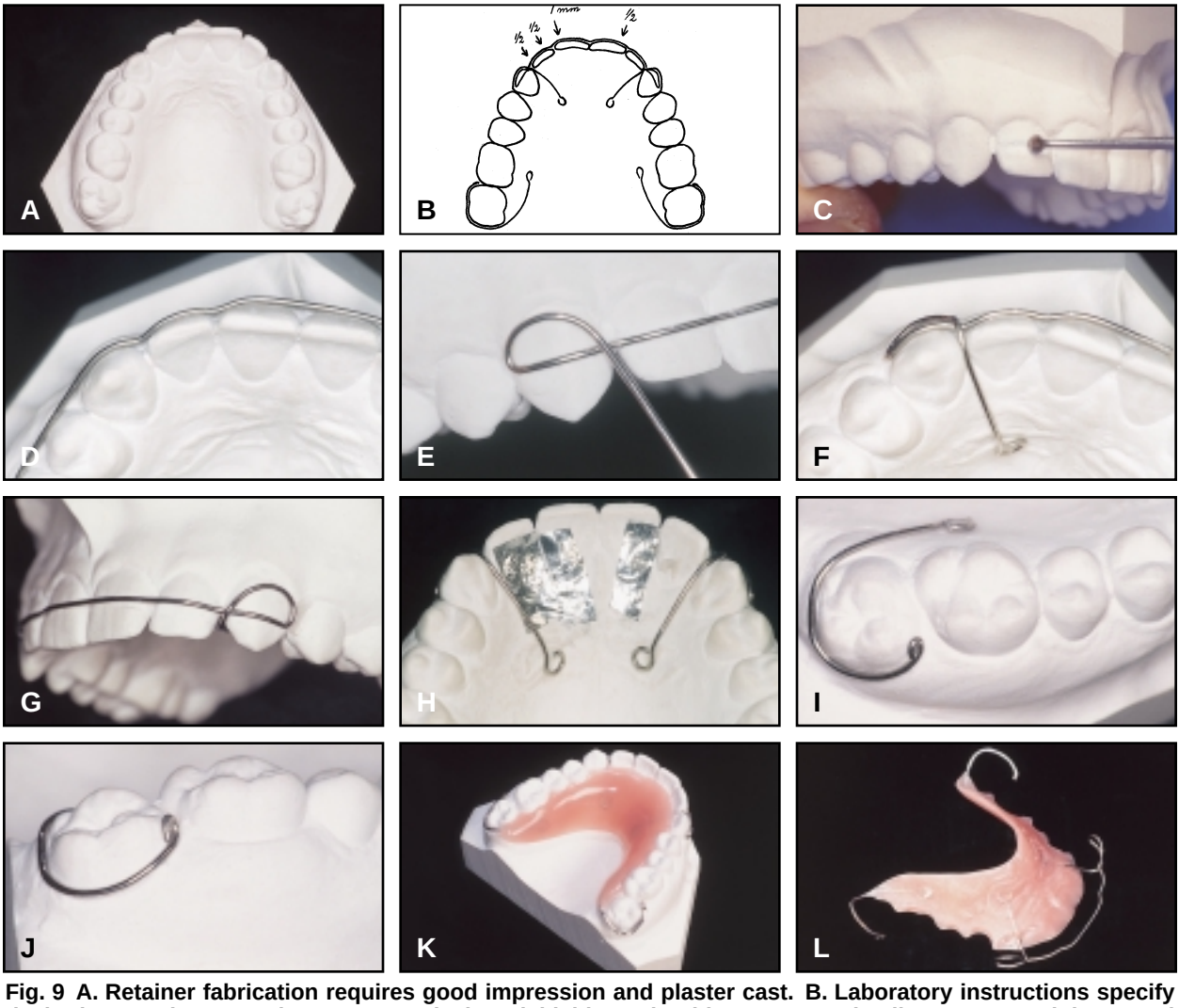

Fig. 9 A. Retainer fabrication requires good impression and plaster cast. B. Laboratory instructions specify desired corrections. C. Plaster removed where labial bow should run more palatally. D. .028" stainless steel spring wire adapted to grooves on cast. E-G. Fabrication of labial bow and clasps at canines. H. Placing well-adapted pieces of tinfoil over palatal surfaces of teeth to be moved palatally creates required spaces while ensuring good adaptation between acrylic and palatal tooth surfaces. I,J. Three-quarter .032" clasp must adapt precisely around terminal molar. Terminal loops enhance mechanical retention—an advantage when second molars need to be displaced. K,L. Retainer after relief of posterior acrylic.

Fig. 10 For displacement of second molar, retainer wire should be some distance away from that tooth distally and palatally.

Fig. 11 If labial bow cannot be precisely adapted to surfaces of incisors, clear acrylic strip can be added over wire to provide necessary control.

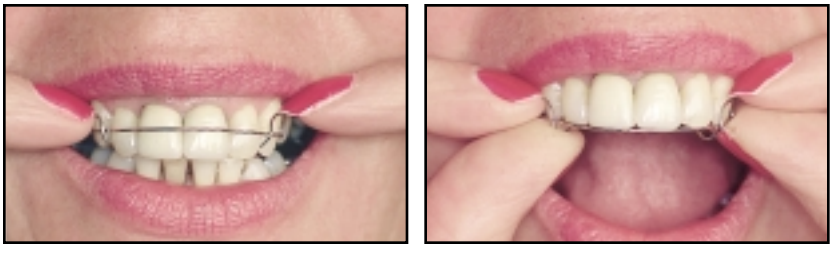

Fig. 12 Van der Linden Retainer should be removed by pulling down with fingernails on most superior portions of canine clasps. Removing retainer by labial bow may lead to deformation.

Final Tips

If the labial bow cannot be adapted precisely enough, an acrylic strip can be added over the wire to achieve a better fit (Fig. 11).

Obviously, the effectiveness of a removable retainer depends partly on its handling by the patient. This retainer should always be carefully placed and removed, and should be stored safely when not worn (Fig. 12). ❑