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ORIGINAL ARTICLES

BAND AND LINGUAL ARCH TECHNIC*

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THE first step in the technic of band making as employed by the author consists of taking a modeling compound impression of the lateral half of the arches, using a half impression tray. The object in taking only a half impression of the arch, or an impression of the molars and premolars of one side only, is to avoid the dragging of the impression as so often occurs if both sides are taken at once. In taking this impression, a half impression tray as used in ordinary crown and bridge-work can be employed, or an entire tray with modeling compound only in one side may be employed. The impression is removed from the teeth parallel with the long axes of the teeth to avoid as much distortion as possible, and to give as good an impression of the occlusal surface of the teeth and the gingival marginal ridge, including the buccal and lingual embrasures, as is possible to secure.

From such an impression a model is made as shown in Fig. 1. The band is then made over this model after the model has been prepared as is shown in Fig. 2. The preparation of the model consists in taking a fine ribbon saw and cutting through the surfaces of the teeth on the mesial and distal sides of the tooth which is to be banded. This cut with the ribbon saw is made a considerable distance below the gingival margin of the tooth as is shown in Figs. 2 and 3 in order to expose the full gingival margin of the tooth for the making of the band. The gingival margin of the tooth is curved to represent the natural curvature of the tooth in the mouth.

After the model has been prepared as shown in Figs. 1 and 2, a wire measurement is then made by taking a fine piece of wire, holding the end of it

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in a broach holder, and twisting it around the tooth. This wire measurement is made at the greatest circumference of the tooth, and is twisted very tight upon the plaster tooth. After twisting tight, a pull is made on the ends, and an extra twist made. The plan of making the bands from this point will be to do everything which will have a tendency to make a band slightly smaller than the natural tooth. The wire measure is then removed from the tooth intact, or can be cut on the lingual side before it is removed and straightened out as shown in Fig. 4. This wire measure is then laid upon a piece of band material the ends of which have been cut on a slant as shown in Fig. 5. The band material may be iridio-platinum, clasp metal, or Neyora elastic gold. If Neyora elastic gold or iridio-platinum is used, the band material is .005 inch thick and .18 inch wide. It will be observed in Fig. 5 that the piece of band material is slightly

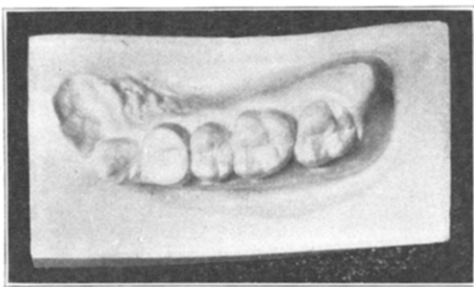


Fig. 1.

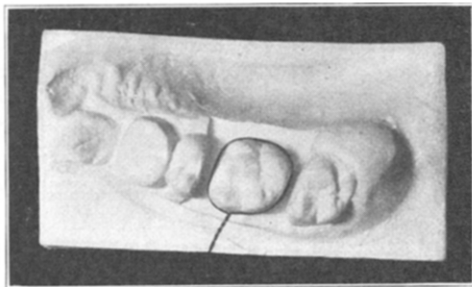


Fig. 2.

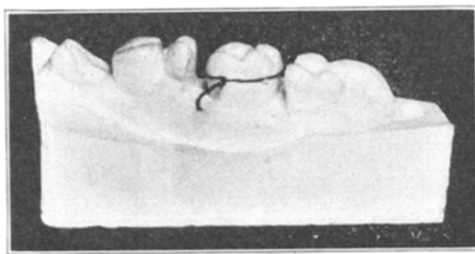


Fig. 3.

longer than the wire measure and should be made about .06 inch longer than the measure. A mark is made on the band material to represent the end of the wire measure. It will be seen from studying Fig. 5 that the long end of the beveled band material represents the measure of the tooth. In other words, when the band is soldered by overlapping the .06 inch which is longer than the wire measure, one edge of the band will be smaller than the wire measurement. Fig. 6 shows the manner in which the ends of the band are brought together and overlap. In making the solder joint, the band must be overlapped far enough to cover the mark on the band, for it must be remembered that this mark represents the end of the measuring wire; and if the mark is not covered, the band will be too large.

After the band is soldered, it will be found that it will not pass the greatest convexity of the tooth; because of the fact that the ends of the band were

cut on the bias the occlusal border is smaller than the gingival border. In fitting this band it then becomes necessary that the band be contoured and stretched in order to adapt it to the greatest circumference of the tooth, and in order to enable the band to slip gingivally past the greatest circumference. The band is placed over the tooth, and a careful note made of the portions that bind at the greatest convexity, then with stretching pliers modified by the author, as shown in Fig. 8, the band is stretched enough to allow it to slip down to the

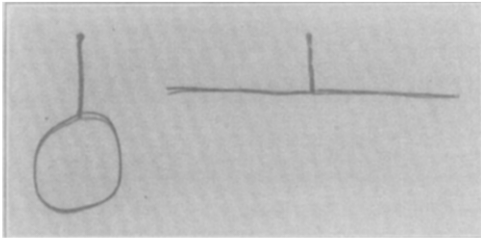


Fig. 4.

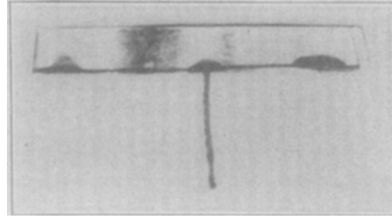


Fig. 5.



Fig. 6.



Fig. 7.

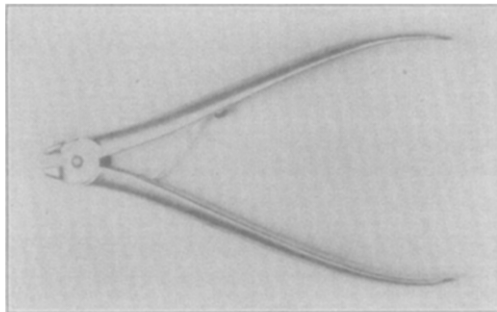


Fig. 8.

gingival portion. The mesial and distal gingival borders of the band are festooned in order to avoid infringement of the band on the gingival tissue. After the band is festooned, the smaller edge or top is carefully stretched until the band slips to the desired position on the plaster tooth. It is not expected that this band, fitted to the plaster tooth, will fit the natural tooth accurately, but it can be fitted so nearly perfect that it will require very little contouring and stretching to adapt and place it on the tooth in the mouth.

In placing these bands on the teeth, the soldered side is placed on the buccal side of the lower molar, and on the lingual side of the upper molar. The

reason for this is the buccal side of the lower molar presents a convexity at the gingival marginal ridge which is greater than that at the occlusal border. On the upper molars, the lingual side presents a greater convexity than the buccal side, therefore the lap is placed on the lingual side of the upper molar. A band that has been contoured and stretched and festooned after the manner described, if it is cut opposite the soldered seam and straightened out, will present an appearance as shown in Fig. 9.

The lower band must be stretched slightly in the lingual occlusal third. The upper molar band is soldered on the lingual side, the overlapped edge is stretched to fit the lingual convexity of the mesio-lingual cusp and the small fifth cusp which is found on the mesial side of the mesio-lingual cusp. After the band has been fitted, the buccal and lingual edges are bent toward the center of the tooth at the gingival border of the mesial and distal edge is festooned so as not to interfere with the proximal gum tissue.



Fig. 9.



Fig. 10.

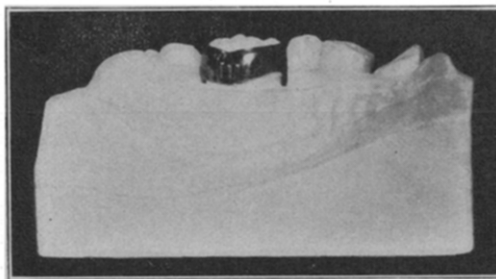


Fig. 11.

The half round tube, as shown in Fig. 10, which is about .10 inch in length, is soldered on the lingual side of the band to receive a half round spur, which is soldered to the lingual arch. The half round tube is soldered with the flat side to the band. These half round tubes may also be soldered on the buccal side of molar bands to be used to receive the attachment of the labial wire in the construction of the pin and tube appliance. The appearance of the band after the soldering of the tube on the lingual side is shown in Figs. 10, 11, and 12. Fig. 13 shows the occlusal view of the model of the lower teeth to which has been fitted two lower bands for technical demonstration which carry perpendicular half round tubes on the lingual side and which show the attached spur on the buccal side for the use of intermaxillary anchorage. After the tube has been soldered on the band, as shown in Fig. 13, the next step is the attachment of the half round spur to the premolar section of the lingual arch as

shown in Fig. 14. As has previously been stated, on the upper molars the seam of the band is made on the lingual side, which makes it necessary to have a half round tube in the proximity of the seam and in a great many instances directly over the seam. The soldering of a half round tube on the seam can be accomplished by using a lower carat solder than the one used for the seam. It must also be remembered that in making these attachments of the half round tube to the band they must be securely soldered to prevent them from being torn loose under the stress of mastication. In attaching a tube on the lingual surface of the upper molar band it must be placed as far gingivally as possible to avoid interference with occlusion when the lingual arch is in position. The tube on the lingual side of the lower molar, providing the molar teeth have the

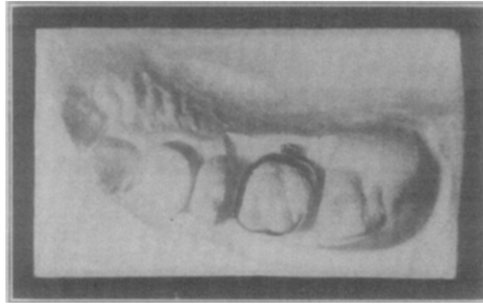


Fig. 12.

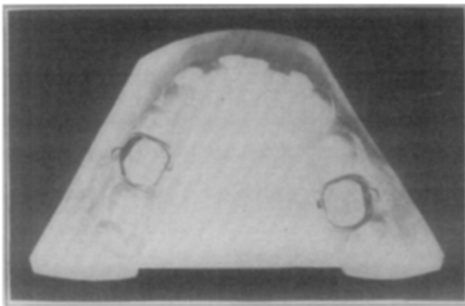


Fig. 13.

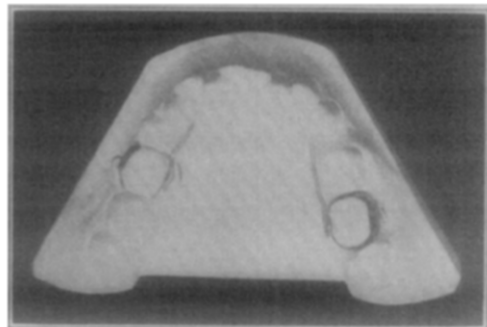


Fig. 14.

proper bucco-lingual relation with each other, can be placed nearer the occlusal border than can the tube on the upper molar, owing to the fact that there is no chance for occlusion to interfere with the tube on the lingual side of the lower molar. In using half round perpendicular tubes on the buccal side of lower molars in the construction of a pin and tube appliance, it must be remembered that the buccal tube must be placed near the gingiva, for in this case it will interfere with the occlusion of the buccal cusps of the upper molars if placed close to the occlusal border.

After the bands have been made and the tubes attached, as shown in Figs. 11 and 12, the bands are then transferred to a full model of the teeth as shown in Fig. 13. A straight piece of 19 gauge wire should be used for the construction of the premolar section of the lingual arch, to which a half round

spur is soldered about .01 inch shorter than the half round tube to allow for the lock at the gingival end of the half round tube. This 19 gauge premolar section of the lingual arch is shown in Fig. 14 and also can be seen in Fig. 17.

Fig. 14 shows how the premolar sections are adapted to the teeth; on the right molar is shown the premolar section without the lock, while on the left molar is shown the locking device for holding the lingual arch in position. This locking device is a modification of what has been known as the Young-Angle

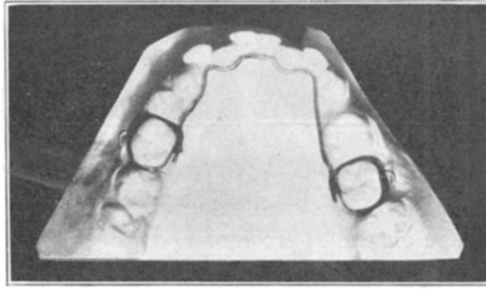


Fig. 15.

lock, and is made by soldering a piece of small gauge wire to the lingual premolar section mesial to the half round spur. This lock should be credited to Young and has been known as the Young-Angle lock. The premolar portion of the lingual arch is made to follow the irregularities of the premolars in each case as can be seen by studying Fig. 14. After the premolar portion has been fitted, the ends are cut off at a point which, as a rule, is distal to the distal surface of the canine or about the center of the first premolar.

The central or incisal portion of the lingual arch is next to be fitted. The incisal portion is also fitted to the irregularities of the teeth as is shown in

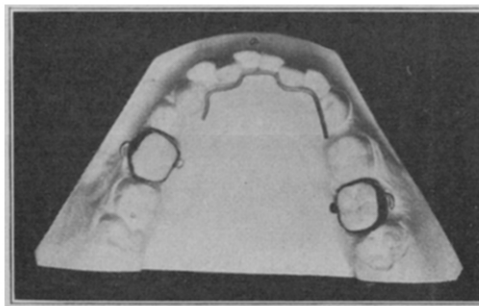


Fig. 16.

Fig. 15. It is made of such a length that the ends of the incisal section will exactly touch and fit evenly the ends of the premolar sections as is shown in Fig. 16. The incisal section is fitted to the teeth to occupy the position slightly occlusal to the gingival marginal ridge. After the incisal section has been fitted to the irregularities of the teeth as shown in Fig. 16, the ends are so shaped that they meet end to end with the premolar section, the three sections are then soldered together with the appliance in position on the model. This

insures accuracy and ease in soldering. The object of making the lingual arch in three sections is, the individual sections can be more easily fitted and the ends better adapted than when an attempt is made to fit an entire arch into all of the irregularities and bring the right and left ends to the proper molar positions and get the proper alignment of the spurs without having a spring or "kick" somewhere in the lingual arch. The various sections of the lingual arch photographed separately are shown in Fig. 17. The small piece of wire in the center is the premolar section before the half round spur has been soldered to it. Fig. 18 shows the lingual arch, one side of which shows a locking device, and on the other side the locking device has not yet been soldered in place. Fig. 19 shows the completed lingual arch soldered together in position on the molar teeth. This lingual arch is then taken off of the model and the bands and arch can be placed upon the teeth in the mouth at one sitting.

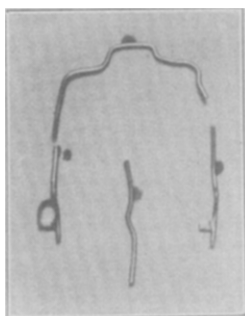


Fig. 17.

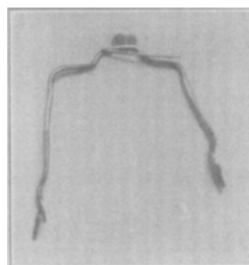


Fig. 18.

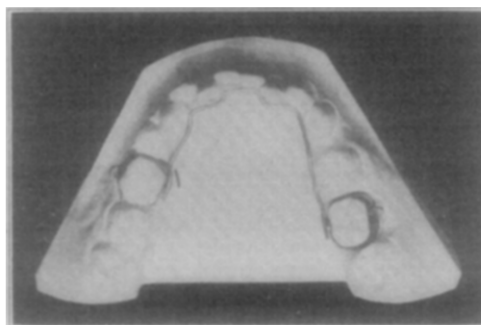


Fig. 19.

An advantage in using this appliance is that only a small amount of space is taken up, and there is not the inconvenience to the patient that is experienced when the entire appliance is put on the teeth at once. The bands are placed on the teeth and the lingual arch is in position in a passive condition and is allowed to remain in a passive condition for a few days. When it is desired to increase the active pressure on the lingual arch or to increase force on the malposed teeth, the locks are carefully removed from the gingival portion of the half round tube, so that the lingual arch can be removed from the tube on the molar band without distortion. By using a pair of Hawley measuring calipers, as shown in Fig. 20, a measurement of the distance between the half round spurs

can be obtained after the manner shown in Fig. 21. After measuring the lingual arch as shown in Fig. 21, the points of the calipers are then set in a fixed position so as to record the distance between the perpendicular tubes on the molars at the time the arch was removed from the molar.

Force is applied to the malposed teeth by taking out some of the irregularities in the lingual arch with a pair of pliers, which increases the size of the lingual arch in the incisal region and exerts pressure upon the malposed teeth. By increasing the width of the incisal section, pressure is brought to bear directly upon the premolar section in the canine region, which has the effect of widening the canines and thereby making room for the malposed teeth

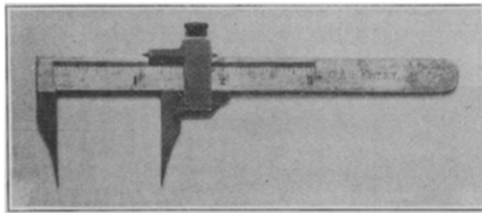


Fig. 20.

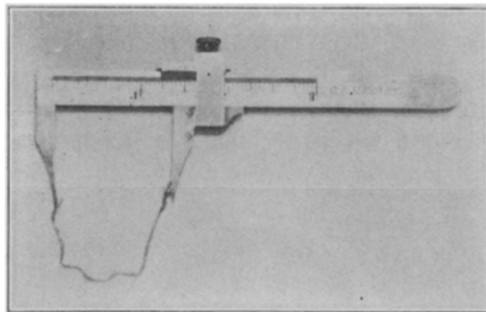


Fig. 21.

to move into their proper position. After taking out the irregularities of the incisal section of the lingual arch and increasing the space between the canines, the molar half round spurs are then checked up by the use of the Hawley measuring calipers which were set at the time the lingual arch was taken out of the molar tubes. The calipers act as a guide in determining how much expansion has been placed in the molar region or how much the perpendicular spurs have been moved either in a buccal or lingual direction. By using such measurements with the Hawley calipers or a similar pair of calipers, it is possible to place the half round spurs back in the half round tubes with the same amount of spring as was present when they were taken out if it is desired. If it is desired to place an expansive force on the molars, the exact amount of expansion which is produced can be checked up by referring to the measurement as shown by the calipers, which was obtained when the lingual arch was taken out of the tubes. If it is desired to rotate the molars, this rotation can also be accomplished by changing the position which the half round spur bears to the half round tube by bending the arch in the premolar region. With the perpendicu-

lar tube it is also possible to tip the molars in any direction desired or to produce a bodily movement. With the lingual arch the pressure exerted upon the teeth is always gentle, and owing to the fact that the arch is fitted to the lingual convexity of the incisors and placed occlusally to the gingival marginal ridge, if the pressure is too great, the 19 gauge arch will spring enough to relieve the pressure and thereby prevent the device making the teeth sore and still give the long range of elasticity which will allow the teeth to move for a considerable length of time. There is no style of appliance with which the author is familiar which has a greater range of elasticity, and at the same time a delicate pressure which is not sufficient to make the teeth sore and still produces physiological tooth movements.

Certain teeth require greater movement than others, as is shown in the left lateral incisors. After the dental arch has been expanded, a spring extension

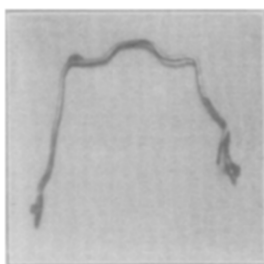


Fig. 22.

spur can be soldered to the arch as shown in Fig. 22, which will exert pressure on the lateral incisor for a considerable length of time without disturbing any of the other teeth. In the majority of cases the author places his extension spur on the gingival side of the lingual appliance. When this spur is first put on it raises the entire lingual appliance slightly occlusally, but there is an active force present which will bring the appliance back to its passive state and thereby produce movement of the teeth desired.

The modern tendency is for orthodontic patients to desire an appliance that is inconspicuous, one that does not interfere with speech, and one that can be kept clean. Of the large number of appliances that have been examined during the past few years which have been brought out in the practice of orthodontia, in the opinion of the author, the lingual arch, used under proper conditions and used with the proper understanding of mechanics, offers the most ideal appliance that has ever been devised.