Twin brackets were developed by Swain principally to improve control over the position of paralleling roots when closing extraction spaces and to achieve more efficient correction of rotation. They are widely used in current orthodontics because of the 3-dimensional control they exert on tooth movement. To control orthodontic tooth movement, orthodontic archwires must be tied into the bracket slots using metal or elastomeric ligatures.

Metal ligatures are stainless steel alloy wires of varying gauge (.009 to .014 inch). Elastic ligatures are circular-shaped elastomers that can be deformed and made to adapt to the brackets so as to support the archwire. Both types are tied to the bracket wings to ensure that the archwire is held in place in the slot. Customarily, it is advisable to seat the archwire in the bracket slot before or while the ligation is being performed; some care must be taken not to disturb the union between the bracket and the tooth, especially if bonding is the source of the union. The great advantage of elastomeric ligatures is the speed with which the archwire can be fixed in place. Elastomers should not be used, however, in cases where firmer tying is required or in special circumstances, such as the ligation of archwires for orthognathic surgery.

When metal ligatures are used, the tips should be twisted together to ensure firmness. Four or five complete turns of the wire are sufficient to obtain a firm tie. The tying can be performed with a great variety of instruments, including Mathieu needle holders, Steiner or Coon ligature tying pliers, or ligature cutter pliers. Once it has been twisted, the ligature should be cut and folded back to avoid traumatizing the buccal or labial mucosa. The positioning of the twist (gingival or occlusal, mesial or distal) depends solely on ease of access for twisting. Whenever feasible, the twisted thread should be folded back under the archwire as close as possible to the bracket (Fig 1A and B). However, ligation with a gingival twisted end is more frequent.

**TYPES OF LIGATION**

**Basic Ligation**

Basic ligation can use either metal or elastic ligatures and is the most common procedure. Tying can be

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*Fig 1. Diagram of basic ties for upper canines: metal ligatures in straight (A) and double-over (B) ties; elastic ligatures in straight (C) and double-over (D) ties.*
straight (simple tie) or double-over (“figure 8 shape” tie) as shown in Fig 1. It should be stressed that full adjustment of a metal ligature can frequently not be obtained solely with the use of a tying instrument. The part of the wire that secures the archwire must be pressed into place manually or with the assistance of an instrument (Fig 2) to prevent subsequent loosening. The

Because most orthodontists presently use twin brackets, what follows is a series of tying recommendations for achieving the correction of rotated teeth using this bracket design. However, rotated teeth are usually more easily corrected with the use of Lewis brackets.

Fig 2. Ligature must be snug with bracket to prevent slackening. Diagram shows correct ligature position from labial (A) and occlusal (B) perspectives; wrong ligature position is shown from labial (C) and occlusal (D) perspectives.

Fig 3. Ligature wire makes a loop around the rotated tooth so that when the wire is twisted, the part of the tooth farther from the alignment is pulled toward the archwire, labial (A) and occlusal (B) perspectives.

Fig 4. Circumferential ligations with elastomeric ligature fitted to one bracket’s wings and linked to the metal ligature. Detail of upper lateral incisor with this combined ligature is shown in labial (A) and occlusal (B) perspectives.
Circumferential Ligations

Although the position of rotated teeth can be corrected by basic ligation procedures, circumferential ligations, specifically for correcting rotations, can be used to tie both anterior and posterior teeth. In the case of anterior teeth, the ligature threads are attached to the bracket tie wings nearest the archwire. They then pass through the interdental spaces to encircle the tooth on the lingual-palatine surfaces, emerging on the labial side via the opposed interproximal spaces for tying to the archwire (Fig 3). In the case of posterior and canine teeth, the same kind of ligation can be used. However, a small retention area can be molded in composite resin or an auxiliary can be placed or soldered onto the lingual-palatine surface to prevent vertical displacement of the ligature wires.

The mechanical efficiency of circumferential ligations can be improved by using a combination of ligature wires and elastomeric ligatures on both anterior and posterior teeth. In this case (Fig 4), the ligature thread passes through the elastomeric ligature previously fitted into the part of the twin bracket closest to the archwire. When the metal ligature is tied to the archwire, the elastomeric ligature will be activated. An additional advantage of this type of tie is that it provides prolonged action of the force applied.

The circumferential ligations should be used with caution because if the ligature wires pass through the anatomic contact points instead of the interdental spaces, interproximal pressures may be created and cause minute irregularities or crowding of the anterior teeth.

Isolated Ligation

Another way to correct rotation is to use an isolated ligation. In this case, the archwire is tied to the wings of only one bracket, the bracket farthest from the archwire (Fig 5D). The slot of the free bracket can then be filled by an elastomeric ligature (Fig 5A), a metallic ligature (Fig 5B), an auxiliary designed specifically for the purpose, eg, a rotation wedge, or even be left empty. Use a finger or an instrument to press the archwire as flush as possible against the bracket to be tied when twisting the ligature wire (Fig 5C and D).

Coil Spring Ligature

Another technique for correcting tooth rotation consists of using a coil spring ligation (Fig 6). To start with, a stainless steel ligature is threaded through a segment of closed coil spring the length of the height of the bracket tie wings. The spring is positioned under the archwire by the bracket closest to the wire. The ligature is threaded under the tie wings and is tied to the archwire by the wings of the bracket farthest away from it. Prefabricated systems that operate in a similar fashion are available; the spring is replaced by an elastic wedge.
Extrusion Ties

In a number of situations, the orthodontist needs to make an extrusion tie for a tooth positioned cervically to such an extent that the archwire cannot be properly bent for insertion in the bracket slot even if loops are made or memory shape alloys are used. The ties are repeated as often as necessary until sufficient extrusion has been obtained for the archwire to be slotted and a basic tie performed. There are 3 techniques for extrusion ties. In the first, the ligature thread is looped around the archwire, wrapped around the cervical portion of the bracket’s wings and attached to the archwire (Fig 7A). In the second, the ligature loops around the cervical wing of one bracket, wraps around the archwire, and is twisted and folded under the cervical wing of the other bracket (Fig 7B). In the last, the ligature thread is looped around the cervical bracket wings, pulled toward the archwire, which it also loops around, and then threaded back to the wing where the tie was initiated. At this point, it is twisted until the archwire becomes slightly deflected (Fig 7C). Whichever technique is used, ensure the twist is made as close as possible to the bracket so that it remains stable, flush, and nontraumatic. When the twist is located closer to the archwire, it is more susceptible to displacement and this can provoke trauma to the buccal or labial mucosa.

Antirotational Tying

In many premolar extraction procedures, elastics or springs are used to retract the canines. Rotation commonly occurs during distal movement of the canines. Correcting the rotation requires additional time and care on the part of the orthodontist. Antirotation tying of the canines (or the first premolars in cases where second premolars have been extracted) is a useful way of preventing such rotation. In this

Fig 7. Three basic techniques for extrusion ties (A, B, and C). Twist should be made snug against the bracket to prevent trauma to the mucosa.

Fig 8. A, Antirotation tying should be performed by inserting a probe between the ligature and the bracket to ensure there is enough slack to reduce friction; B, only then should the device used for distalization of the canine be adjusted, in this case with an elastic chain.
In cases where segmented round archwires are used, a stabilization tie may be useful to prevent the wire rotating in the bracket slots. In the detail, the loop around the vertical bend is incorporated into the archwire.

Fig 9. In cases where segmented round archwires are used, a stabilization tie may be useful to prevent the wire rotating in the bracket slots. In the detail, the loop around the vertical bend is incorporated into the archwire.

Fig 10. Stabilization ties fasten an artificial tooth to a round archwire in the alignment and leveling phases. This improves esthetics without the need for more expensive or time-consuming procedures such as removable prosthetic appliances.

Fig 11. Tie togethers can be used to support the archwire (A and B) or not (C and D), being cross-tied in the interbracket area (A and C) or twisted (B and D). Additional ligatures must be used when the archwire is not supported by the tie together (C and D).

case, the wings of the distal bracket alone should be tied to prevent it from moving away from the archwire during retraction. During the tying procedure, the tip of a clinical probe is inserted between the bracket and the ligature thread, allowing a slight amount of slack to ensure freedom of movement (Fig 8A). Only when this procedure has been completed should the retraction device be adjusted (Fig 8B).
Stabilization Tie

Some clinical situations require the use of segmented round archwires. One problem that arises in such cases is the rotation of the archwire in the bracket slots because of a combination of the curve of Spee and the shape of the archwire. One way to prevent such rotation is to make a stabilization tie. This can be done by introducing a vertical bend at one end of the archwire. The technique consists of using the ligature wire to bind the vertical section of the archwire so that the loop tightens even more when the tie is made (Fig 9). The same principle allows one to attach artificial teeth to round archwires in the initial phases of treatment for patients with missing teeth. This requires incorporation of a simple loop on the archwire, slightly larger than the height of the bracket and at the mesial or distal. The loop must be located next to the bracket. Tying is performed by the procedures described above (Fig 10).

Tie Together

Certain clinical conditions require binding groups of teeth together by means of a tie together. There are 2 basic forms of tying together: over the archwire (Fig 11A and B) or under the archwire (Fig 11C and D). In either case, the ligature can be cross-tied or twisted, the latter providing greater stability and better hygiene (Fig 11B and D). When the tie together is made under the archwire, additional ligatures are required to fasten the wire to the brackets (Fig 11C and D). This underarch tie allows for the archwire to be replaced without having to redo the tie together.

CONCLUSIONS

1. The design of twin brackets can be implemented in different ways to obtain tooth movement.
2. Knowing how to use all the bracket’s resources makes for better and/or faster treatment results.
3. Orthodontists should use their knowledge and creativity in tying the brackets as tools for obtaining excellence in orthodontics.

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