

Different Methods of Canine Retraction- Part 1

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Abstract Background: This review aimed at explaining different methods of canine retraction along the archwire. Methods: Searching for different methods of canine retraction using fixed orthodontic appliances was carried out using different databases, including PubMed Central, Science Direct, Wiley Online Library, the Cochrane Library, Textbooks, Google Scholar, Research Gate, and hand searching from 1930 till February 2022. Results: After excluding the duplicate articles, papers describing the methods of canine retraction along the archwires were included. The most commonly used methods are NiTi closed coil spring and elastic chain. Conclusions: Various methods of canine retraction along the archwires were explained in detail regarding their advantages, disadvantages, and comparisons among different methods supported by clinical trials, systematic review, and meta-analysis. The preferred method is canine retraction with NiTi closed coil spring with 150 and 200 gm. Elastic chain is considered an alternative, low-cost option.

Keywords: Canine, retraction, fixed appliance, frictional technique.

Introduction

Orthodontic correction of different malocclusions may entail extraction of some teeth to create space for alignment and retraction of the anterior teeth. Such a case like class II and bimaxillary proclination may need extraction of first premolars and retraction of anterior teeth.

Anterior teeth retraction can be performed by two major methods: two stages and one-stage (en-masse) methods⁽¹⁾. The uses, advantages, and disadvantages of each method will be discussed below.

Two-stage space closure (separate canine retraction)

Tweed⁽²⁾ advocated two stages of space closure involving canine distalization followed by retraction of incisors. He believed that by this method, the anchorage would be preserved as light force will be applied to distalize the canine to be ligated then in the anchorage unit with the posterior teeth; after that, the retraction of incisors will be commenced.

Two-stage retraction is used to manage cases with severe anterior teeth crowding, flared incisors, extruded or high canines, and midline discrepancies⁽³⁾.

There are some arguments about anchorage preservation by this method compared to one-stage retraction although Heo *et al.*⁽⁴⁾ proved no significant difference in terms of anchorage loss of posterior teeth and amount of retraction of anterior teeth between the two methods.

There are many disadvantages to this method⁽³⁾:

1. It is a more complicated procedure.
2. Relatively unaesthetic as momentary space will be created distal to the lateral incisor after canine retraction.

3. It takes a longer treatment time.
4. Iatrogenic extrusion of the incisors may occur resulting in an anterior deep bite.

One-stage space closure (En-masse retraction)

This method was developed by Bennett and McLaughlin ⁽⁵⁾ utilizing a 0.019×0.025 inch stainless steel archwire to retract the whole anterior teeth at one time using an active tie-back extended from the hook of the molar band to a soldered hook distal to the lateral incisors. The tie-back is an elastic module stretched twice its length (about 2-3 mm) to produce 50-150 gm force resulting in space closure at a rate of 0.5-1.5 mm per month. This tie-back is usually replaced every 4-6 weeks.

The main advantages of this method included:

1. It takes a relatively shorter time.
2. Anchorage is comparable with two stages retraction method.
3. Uncomplicated method and takes less chairside time.
4. The dental arches are controlled by heavy gauge rectangular archwires.

While the disadvantages included:

1. Variable force levels in case of using elastic chain.
2. The elastics may slip off their position.
3. Using an elastic band may be compromised by the patient's cooperation.
4. Using a closed coil spring may cause tipping and binding if excessive force is applied.

Canine retraction

Generally, canine retraction can be performed using removable or fixed orthodontic appliances. With the fixed orthodontic appliance, canines will be retracted by two principal methods; either by sliding along the archwire (frictional retraction) or by sliding with the archwire (frictionless retraction) ⁽³⁾. Each method has advantages and disadvantages that will be discussed in detail. Some other methods that combined both techniques or utilize new technique may also be present.

Canine retraction along the archwire (frictional technique)

In this technique, the canine will move along the archwire by sliding, just like train movement on rails. It is performed on a continuous stainless steel archwire extended from the molar to the molar on the other side using many tractions means like elastics and springs ⁽⁶⁻⁸⁾.

This technique has the following advantages ^(7,9):

1. Simple technique.
2. Changing elastic is very easy, and archwire removal is not required.
3. Elastic traction can be applied from buccal and lingual sides to reduce the rotation and flaring.
4. No complicated wire configurations are needed, so less chair-side time is required, and patients get more comfort and can maintain oral hygiene effectively.

On the other hand, there are many disadvantages inherited with this technique like:

1. Any interaction between archwire, brackets, and ligatures causes friction and binding, making mechanics unpredictable, impairing tooth movement, and affecting anchorage ⁽⁹⁾.
2. Using flexible archwires or excessive force during retraction may cause extrusion of incisors resulting in an iatrogenic anterior deep bite ⁽¹⁰⁾.
3. Problems associated with using elastics for retraction include cleaning, breakage, difficulty assessing the force applied, and rapid decay ^(7,11).

Methods of canine retraction along the archwire

Reviewing the literature revealed that there are eight methods for distalization of canine along the archwire according to the type of traction means:

- (1) Elastic thread.
- (2) Elastic chain.
- (3) Elastic ligature.
- (4) Elastic bands.
- (5) Coil springs.
- (6) Extra-oral traction using J-hook.
- (7) Sliding jig and traction.
- (8) Lace-back.

(1) Elastic thread

According to Daskalogiannakis ⁽¹²⁾, an elastic thread can be defined as a stretchable thread produced from elastic materials and used mainly to apply forces that move teeth (Figure 1).

It is one of the oldest methods used to retract the canines, usually coming in two forms and two sizes: the cotton covered and the plain uncovered thread with 0.625 mm (0.025 inches) and 0.75 mm (0.030 inches) in size.

It retracts the canines by tying in a figure of eight under the archwire either from the second premolar or the first molar. Here the canine must be loosely ligated with stainless steel ligature wire to prevent its rotation upon retraction; moreover, the second premolar and first molar must be ligated firmly to get adequate anchorage.

With this method, the canine must be retracted on a rigid, closely fitting to the bracket's slot archwire; otherwise, retraction on a thin and flexible archwire with excessive force will lead to bowing of the archwire (roller coaster effect) and the development of iatrogenic anterior deep bite and posterior open bite with mesial tilting of the posterior teeth (loss of anchorage) ⁽³⁾, so this method is not recommended to retract canines on thin and flexible archwires.

Farrant ⁽⁶⁾ summarized the advantages and disadvantages of this method as follows:

Advantages

1. Elastic thread is neat and comfortable for the patient.
2. It has remarkably good elastic properties.
3. No need for the patient's cooperation.
4. The cotton-covered type of elastic thread is easier to knot firmly.
5. The uncovered thread is supposed to remain clean in the mouth.
6. Regarding the size, the 0.75 mm thread provides a greater force than the 0.625 mm one.
7. The 0.625 mm thread is thin enough not to contact the archwire when ligated to the canine's bracket.

Disadvantages

1. Tying the knot is time-wasting.
2. The cotton-covered elastic threads become dirty in the mouth after a short tying period because of food adherence, unlike the uncovered thread.
3. The uncovered thread is slick, so the knot can gradually loosen and become untied if not it is pulled very tight.
4. It can cause cheek irritation if not tucked out carefully.
5. The amount of force applied is difficult to adjust.
6. Unlike 0.75 mm thread which is relatively bulky, the 0.625 mm thread can be cut upon tying on the edge of the bracket.

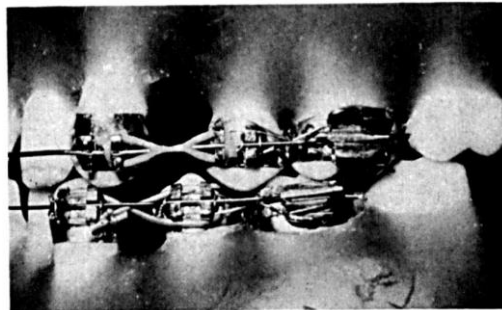


Figure 1: Using of elastic thread for canine retraction in the lower arch

(2) Elastic chain (elastomeric power chain)

It is one type of elastic module that comes in a chain of connected elastomeric rings of different configurations like the closed-loop, short, and long filaments depending on the amount of distance between the rings in a passive state⁽¹²⁾. It is considered the most popular space closure method by sliding along the archwire, like in the case of canine retraction by stretching from the canine to the second premolar brackets or the hook of the molar tube (Figure 2). Like the elastic thread, the second premolar and first molar must be connected tightly with steel ligature wire.

The **main advantages** of the elastic chain are: ^(6,7,13,14)

1. Simple to apply.
2. Inexpensive.
3. Easy to be replaced with no need to remove the archwire (less chair time).
4. No need for the patient's cooperation.
5. It causes minimal food stagnation.

6. It can be applied from the buccal and lingual directions, minimizing rotation's side effect during retraction.

While the disadvantages are:

1. Forces applied are tricky to assess, and the forces reduce rapidly (force decay) with wearing ^(11,15), although a power chain with low force decay is available now.
2. It may break if not appropriately placed⁽⁷⁾.
3. Difficult to clean, absorb saliva, and stain easily with dietary foods and beverages ⁽⁷⁾.
4. Depending on its attachment to the canine bracket, if it engages the whole wing of the bracket, it will cause tooth rotation and may increase the friction and binding that decrease the rate of tooth movement and threaten the anchorage ^(11,16,17).
5. Needs monthly replacement in order for the force remains adequate for retraction ⁽¹⁸⁾.



Figure 2: Using of elastic chain for canine retraction

(3) Elastic ligature (active tie-back)

Bennett and McLaughlin ⁽⁵⁾ introduced this method for en-mass retraction of anterior teeth and can be used for canine retraction too. The retraction is performed on a rigid stainless steel archwire with the canine ligated loosely with steel ligature wire. In this method, a single elastic ligature is attached to the hook of the canine by ligature wires extending from the hook of the first molar (Figure 3). The activation of this elastic tie-back is done by tightening the ligature wire so that the elastic ligature will be twice its original size to produce a force of about 50-150 gm. The tie-back can be replaced every four to six weeks.



Figure 3: Using of active tie-back for canine retraction

(4) Elastic band

An elastic band is an elastomeric ring used to generate forces to move teeth depending on its purpose, location, and orientation ⁽¹²⁾. It can be used in a single arch (intra-maxillary) or between both arches (inter-maxillary). It may be hooked over a prefabricated ligature hook (Kobayashi ligatures), attached to the

hook of the brackets or welded hook on the archwire (Figure 4). Using an elastic band is helpful to tip the mesially angulated canine distally along a thin and flexible archwire using light force, yet it is not indicated for retracting an already upright canine that needs bodily movement ⁽⁶⁾.

Advantages

1. Simple in wearing and removal.
2. The force of retraction is light and predetermined.
3. It can be applied easily by the patients using elastic director.

Disadvantages

1. Needs the patient's cooperation.
2. It is not an effective method to retract the canine bodily along the archwire as the strong elastic is required for this action which may cause rotation and excessive binding of the canine; moreover, the force is brutal to be directed along the archwire.

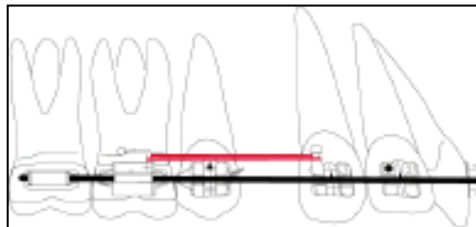


Figure 4: Using of elastic band for canine retraction

(5) Coil springs

Basically, coil springs can be classified into open and closed also either on or off the archwire. Open coil spring may be utilized as an inter-canine coil, push coil, pull the coil, push-pull coil, and open rotation coil. The closed coil may be called a closed rotation coil, contraction coil (single or double Nagamoto), or a Pletcher T-spring ⁽¹⁹⁾.

An open coil spring is a wound spring activated by compression and applied a net "pushing" force in two directions away from its center. The closed one is activated by tension so that the applied force is pulling or retraction ⁽²⁰⁾.

The coil spring is usually made of stainless steel, nickel-titanium, or Co-Cr-Ni alloy, and it may be coated (Tooth tone) to get maximum esthetics. Regarding the open coil spring, the Nickel-Titanium one is preferred over the stainless steel because it delivers continuous force for opening or holding spaces between teeth ⁽²¹⁾.

Many methods have been utilized for the coil springs to retract canine ⁽⁶⁾: (a) Threaded onto the archwire and compressed between the two canine brackets; (b) compressed between a soldered stop on the archwire and the canine bracket; (c) compressed between an incisor bracket and the canine; (d) compressed by a tie-back ligature; (e) expanded tied back coil spring and (f) NiTi closed spring between the first molar or miniscrew and canine.

(a) Coil spring threaded onto the archwire and compressed between the canine brackets

A piece of push coil spring with a length of less than $\frac{3}{4}$ of the distance between the canines is cut and threaded on the archwire, excluding the incisors (Figure 5). The canines must be ligated loosely with stainless steel ligature wire to prevent their rotation during movement. The archwire must be rigid and closely fit the bracket slot and must not be cinched down at each end distal to the molar tubes to prevent the reciprocal forward movement of the archwire ^(6,19).

Advantages

1. Constant force can be delivered over a long distance.
2. It requires little reactivation.
3. The applied force can be easily quantified.

Disadvantages

1. Irritation of the lip.
2. Unaesthetic.
3. Unhygienic.
4. Buccal distortion of the archwire will cause an increase in the inter-canine width during distal movement of the canines due to the distal and lateral components of the force exerted by the spring.
5. Lingual root torque of the molars due to the lingual distortion of the wire ends that occurs simultaneously with the buccal distortion.
6. Mesial movement of the molars will have occurred if the wire ends cinched back because the length of the wire will be shortened by this bend.

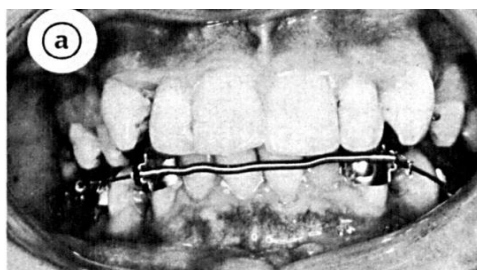


Figure 5: Canine distal movement with coil spring between the canine brackets

(b) Coil spring compressed between a soldered stop on the archwire and the canine bracket

A soldered post or small piece of wire is soldered on either side of the archwire to stop at the distal margin of the lateral incisor or between the lateral and central incisors (Figure 6). A piece of a little more than half the distance from the stop to the canine is threaded on the archwire, which should closely fit the bracket's slot. Again the canine must be ligated loosely with steel ligature wire ⁽⁶⁾.

Advantages

1. Irritation of the lip is less than the longer one.
2. The applied force can be measured easily.
3. The amount of reactivation is little either by using a small piece of coil spring (2 mm length left distal to the canine) or with a flowable composite or metal stop.

Disadvantages

1. Annealing the archwire due to soldering the stop may be anticipated, so crimpable stops are preferred.
2. Increase in the inter-canine distance but less than that with the long one.
3. It needs frequent reactivations.

(c) Coil springs compressed between an incisor bracket and the canine tooth

In this method, a piece of push coil is threaded on the archwire between the brackets of the canine and lateral incisor or between the canine and central incisor (Figure 6). This method is good in closing median diastema by the reciprocal action of the coil spring on the incisors. The canine and incisor must be ligated loosely. Care must be taken to ligate the central incisor when the push coil is between the canine and lateral incisor brackets to prevent moving the central incisor out of alignment. The advantages are just like in point b ⁽⁶⁾.

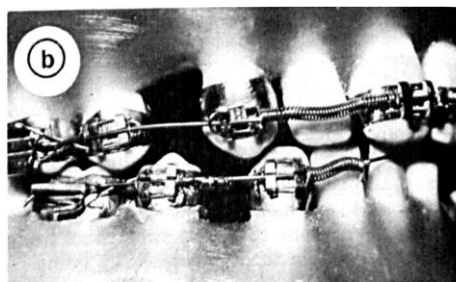


Figure 6: Canine retraction using coil spring compressed between a soldered stop on the archwire and the canine bracket in the lower arch and coil springs compressed between an incisor bracket and the canine tooth in the upper arch

(d) Coil spring compressed by a tie-back ligature

A piece of 3-4 mm length coil spring is threaded on a rigid, closely fit the bracket's slot archwire just mesial to the canine activated by stainless steel ligature wire extends from the brackets of a second premolar or first molar (which must be ligated tightly to preserve the anchorage) to pull the coil spring compressing it against the canine (Figure 7).

In order to reduce the possibility of ligature wire fracture, the whole length of the tie-back ligature from the coil spring to the second premolar must be twisted and lying alongside the archwire so as not to interfere with the movement of the canine ⁽⁶⁾.

Advantages

It can be easily activated by just tightening or retying the tie-back ligature.

Disadvantages

1. A ligature tie extended from the first molar is too long and liable to damage.
2. Interference with canine movement may be anticipated because of the difficulty in placement.

(e) Tied back expanded coil spring

In this method, a closed coil spring instead of an open coil spring is used. A piece of 5 mm. length of closed spring is used to distalize, not push (mesialize) the canine. A ligature wire is threaded to the last four or three coils of the spring and tied loosely to the brackets of the canine from one side and the hook of the molar band (tube) from the other side, then the ligature is pulled tightly to activate the spring by opening it (Figure 7). The spring lies alongside the archwire, not threaded on it because of insufficient space to activate a length of closed coil spring on the archwire. This method is indicated to retract mesially angulated canine along a thin and flexible archwire and retract canine bodily along a rigid archwire ⁽⁶⁾.

Advantages

1. Instant application of the coil spring with no need to remove the archwire.
2. The applied force can be readily calculated.
3. Simple reactivation of the spring by just tightening the ligature wire around the molar tube.
4. As the coil is located behind the canine, the inter-canine width will not be increased.

Disadvantages

1. The possibility of damage is high as it is not threaded on the archwire.
2. Fracture of the ligature tie is inevitable, which may stop the movement of the canine or cause trauma to the patient's lip or cheek.
3. The spring tends to trap food (unhygienic).

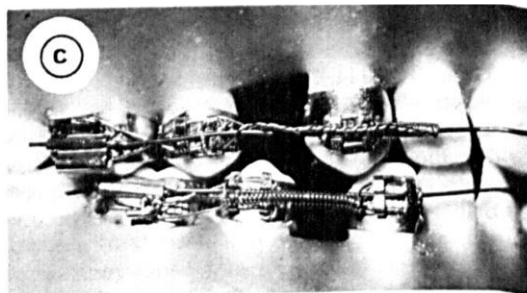


Figure 7: Canine distalization using coil spring compressed by a tie-back ligature in the upper arch and using tied back expanded coil spring in the lower arch

(f) NiTi closed spring between the first molar or mini-screw and canine

This type of spring is manufactured from Nickel-Titanium alloy and indicated to close large spaces when infrequent adjustment is preferred ⁽²²⁾. It is available in 6, 9, and 12 mm and three levels of force; light, medium, and heavy. Some types are provided with a large diameter stainless steel key-end eyelet that fits the head of miniscrews. It can be extended from the first molar hook to the canine for the canine retraction or to a soldered hook or crimpable hook located just distal to the lateral incisor for en-masse retraction. It can also be tied to the miniscrews for the same purposes (Figure 8). Bonding a modified long hook or power arm above the canine bracket to act as a point of attachment near the canine's center of resistance is preferred when canine retraction is performed on miniscrews ⁽²³⁾.

Advantages

1. Compared to the elastomeric chain, it produces more consistent space closure till the terminal of the deactivation stage is reached.
2. It can be placed and removed easily without archwire removal.
3. It does not need reactivation at each appointment.

Disadvantages

It is relatively unhygienic in comparison with elastomeric chains.



Figure 8: Canine retraction using NiTi closed spring

(6) Extra-oral traction using J-hook

By this method, the canine can be retracted either in the maxillary arch or in both arches (with some modification) also on both flexible and rigid archwires using extra-oral force and intra-oral attachment of either ready-made or manually bent small open circle to be hooked directly on the archwire mesial to the canine brackets that are ligated loosely with steel ligature wire. The direction of pulling must be as near as possible along the occlusal plane during the maxillary canine retraction (Figure 9).

Using this technique to retract all four canines mutually, a high pull headgear can be used for the maxillary canines while a straight pull for the mandibular ones ⁽⁷⁾.

Advantages

- 1- Anchorage is conserved as the reaction outside the oral cavity (head).

- 2- When a retraction is performed on a rigid archwire, the possibility of tipping is minimized to some extent.
- 3- Overjet reduction may frequently be seen.
- 4- Bite opening may be seen, which is beneficial in treating deep bite cases.

Disadvantages

- 1- Patient cooperation is a significant issue.
- 2- The force application is intermittent, so canine retraction may be slower.
- 3- The chance of developing soreness at the corners of the mouth from the side piece arms is high.

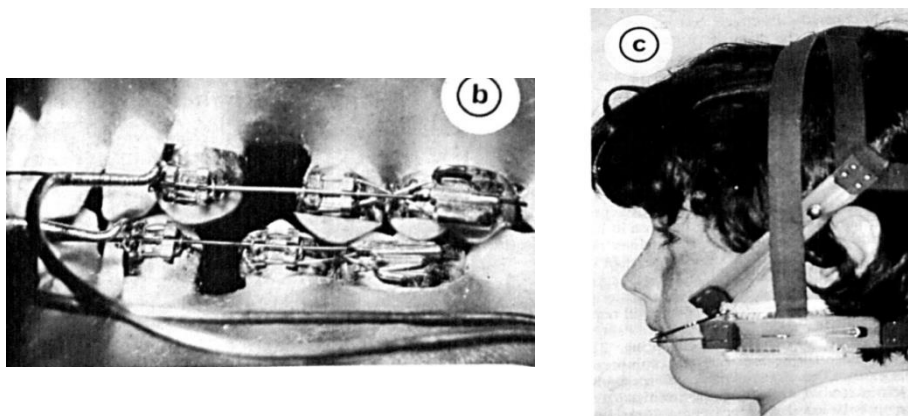


Figure 9: Canine retraction with J-hook.

(7) Sliding jig and traction

One of the methods used to retract the canine is a sliding jig with elastic for traction. It is made of a piece of 0.55 mm round wire or 0.017×0.022 inch rectangular wire that slides on the main archwire. A piece of 4 mm length open coil spring is threaded on the archwire to be between the circle of the jig and the mesial surface of the canine's bracket (Figure 10). The traction force is applied to the jig's hook using either intra- or intermaxillary elastics or extra-oral traction that compressed the coil spring against the canine bracket. The canine is preferably retracted on a rigid archwire ⁽⁶⁾.

Advantages

1. Bodily movement of the canine is expected because the exerted force by the elastics is directed along the archwire.
2. The possibility of developing soreness of the corners of the mouth is decreased by using EOT as the jig will bring the point of force application of the EOT forward.

Disadvantages

1. The jig is relatively difficult to fabricate.
2. It should be fabricated with the correct length to allow free distal movement of the canine.

3. It may rotate around the archwire and become trapped under the bracket.
4. It may cause cheek irritation and food trapping because it is bulky.

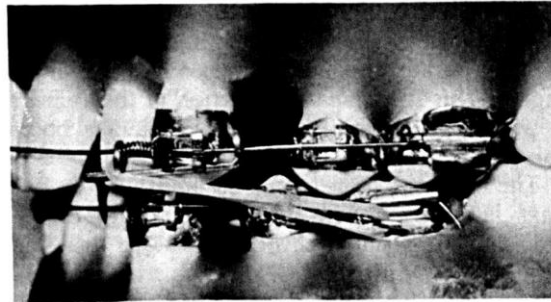


Figure 10: Canine retraction using sliding jig and elastic traction

(8) Lace back

It is a 0.010 or 0.009-inch stainless steel ligature wire that extends from the hook of the first molar tube or band to the canine bracket in a figure of eight light ligations under the archwire (Figure 11).

It is used mainly to maintain the anchorage by restricting the crown of the canine from tipping forward during the leveling and alignment stage, but it has been shown that it is effective in canine retraction without causing unwanted tipping. The mechanism of canine retraction by the lace-back can be explained by the initial slight distal tipping of the crown of the canine followed by a period of rebound due to the effect of the archwire in aligning the teeth during which distal movement of the root of the canine is achieved. It can be adjusted monthly by tightening about 1-2 mm⁽²⁴⁾.

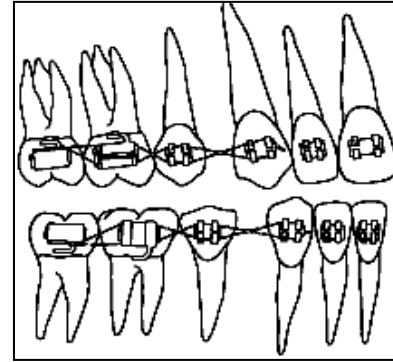
Advantages

1. Easy to perform.
2. Not need patient cooperation.
3. Cheap.
4. Less chair time.
5. It produced more controlled canine movement in the sagittal, vertical, and transverse planes.

Disadvantages

The amount and rate of canine movement are less than the superelastic NiTi closed coil springs.

Figure 11: Canine retraction with lace-back



Evidence about mechanics of space closure

With the presence of various canine retraction methods, choosing the best method for the patients and orthodontists is crucial. Many randomized and non-randomized clinical trials have been done to compare the rate of space closure using different techniques.

Sonis *et al.* ⁽¹⁸⁾ compared the rate of canine retraction using elastic thread and two types of elastomeric chains and found a non-significant difference among the groups. They concluded that the elastomeric chain is more hygienic and needs less chair-time in its application than the elastic thread.

Comparing the rate of space closure using NiTi coil spring and tie-back, many studies ⁽²⁵⁻³⁰⁾ have shown that NiTi spring produced a significantly greater and more consistent rate of space closure than the modules with no difference clinically regarding tooth position. Along with the findings of the previous studies, Samuels *et al.* ⁽³¹⁾ evaluated the rate of teeth movement during retraction along the archwire using NiTi closed coil spring with different force levels (100,150 and 200 grams) in comparison with elastic active tie-back and found that at the force levels of 150 and 200 grams, there was no significant difference in the rate of space closure between these two force levels and the movement was faster in comparison with either spring delivered 100 grams force or the active tie-back.

Sonis ⁽²¹⁾ compared the rate of canine retraction using NiTi closed coil spring compared to the 3/16" elastic band and found that the spring produced a rate of canine distal movement of nearly twice as rapid as elastic bands with the advantage of excluding the patient's cooperation.

Dixon *et al.* ⁽¹³⁾ compared three space closure methods: NiTi closed coil spring, elastomeric power chain, and active tie-back. They found that NiTi coil spring produced a more rapid rate of space closure than other methods, on the other hand, the elastomeric power chain offered a cheaper treatment modality that was as effective as the spring, on the other hand, active tie-back was the slowest option. This conclusion is confirmed in Mahobia and Mahobia's study ⁽³²⁾. Nevertheless, Mitra *et al.* ⁽³³⁾ concluded that active tie-back is better than elastic chain in space closure.

Many studies ⁽³⁴⁻⁴¹⁾ compared the rate of space closure between NiTi closed coil spring and elastomeric chain and found that both of them have the same rate of space closure. This can be confirmed by a recent study carried out by Barsoum *et al.* ⁽⁴²⁾, who found the same findings regarding the rate of tipping, rotation distal movement of canine also root resorption.

Sueri and Turk ⁽⁴³⁾ compared the effects of lace back and NiTi closed coil spring in canine distalization during the leveling and aligning stage and found that lace back is effective in retracting canine, but the rate of distal movement was slower significantly in comparison with the spring. Nevertheless, a more controlled canine movement was obtained in three planes of space was gained with the lace back.

Norman *et al.* ⁽⁴⁴⁾ compared the rate of space closure using stainless steel and NiTi closed coil spring and found that stainless steel closed the space as rapidly as the NiTi one.

Goyal *et al.* ⁽⁴⁵⁾ evaluated the effectiveness of NiTi and stainless steel closed coil spring, elastic chain and active tie-back in closing extraction spaces and found that the stainless steel spring was clinically as effective as the NiTi one in addition to its lower cost, so it can be considered as a good alternative to Ni-Ti coil spring. On the other hand, active tie-back was as efficient as the elastomeric chain with no significant difference in the rate of retraction between the two groups.

Finally, according to the latest systematic reviews and meta-analyses, the findings of the previous studies have been confirmed regarding the efficiency of power chain and NiTi spring in space closure with low to moderate-quality evidence that NiTi spring produced a faster rate of space closure ^(46,47). On the other hand, the quality of evidence is moderate in favor of NiTi coil springs in comparison with the active tie-back ⁽⁴⁷⁾.

Further studies are needed to find evidence for any difference between different means of space closure in terms of anchorage loss.

Conclusions

Various methods of canine retraction along the archwires were explained in detail regarding their advantages, disadvantages, and comparisons among different methods supported by clinical trials, systematic reviews, and meta-analyses. The preferred method is canine retraction with NiTi closed coil spring with 150 and 200 gm force. Elastic chain is considered an alternative, low-cost option.

The orthodontists' preference, the state of malocclusion, and the anchorage demand may guide the orthodontist to select the best retraction method.

Conflict of interest: None.

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العنوان: الطرق المختلفة لسحب الناب- الجزء الاول

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المستخلص

الخلفية: هدفت هذه المراجعة إلى شرح الطرق المختلفة لسحب الانياب على طول السلك المقوس. الطرق: تم إجراء البحث عن طرق مختلفة لسحب الانياب باستخدام أجهزة تقويم الأسنان الثابتة بالاستعانة بقواعد بيانات مختلفة ، بما في ذلك PubMed Central و Science Direct و Wiley Online Library ومكتبة Cochrane والكتب المدرسية و Google Scholar و Research Gate والبحث اليدوي من عام ١٩٣٠ حتى فبراير ٢٠٢٢. النتائج: بعد استبعاد المقالات المكررة ، تم تضمين الأوراق التي تصف طرق سحب الانياب على طول الأسلاك المقوسة. أكثر الطرق شيوعًا هي النوابض الملفوفة المغلقة و NiTi والسلسلة المرنة. الاستنتاجات: تم شرح طرق مختلفة لسحب الانياب على طول الأسلاك المقوسة بالتفصيل فيما يتعلق بمزاياها وعيوبها ومقارنتها بين الطرق المختلفة التي تدعمها التجارب السريرية والمراجعة المنهجية والتحليل التلوي. الطريقة المفضلة هي سحب الناب باستخدام نابض ملفي مغلق NiTi بقوة ١٥٠ و ٢٠٠ جم. تعتبر السلسلة المرنة خيارًا بديلًا منخفض التكلفة.