THE PRACTICE BUILDING BULLETIN
VOLUME IV
ISSUE II

THE TWIN BLOCK APPLIANCE
Helping to grow beautiful faces

BEFORE **AFTER**

» INTRODUCTION:

Malocclusion is rarely, if ever, the result of a single factor. Therefore, when treating a patient with a malocclusion, our goal is not just to realign teeth, but to achieve a proper balance between teeth, bone, and muscle.

Today as dentists, we recognize our role in guiding the growth and development of our patients. The use of functional jaw orthopedics, at the correct time during growth, can ultimately result in the patient achieving a broad beautiful smile, an excellent functional occlusion, a full face with a beautiful lateral profile, and a stable and healthy temporomandibular joint.

Although a wide variety of appliances have been successfully used to achieve a proper functional occlusion, most of them share one major disadvantage. The upper and lower components are joined together making it difficult for the patients to speak and function normally. The end result is poor patient compliance.

The Twin Block Appliance, as featured in this bulletin, has overcome these disadvantages. In fact it is often described as the “most comfortable and the most esthetic of all the functional appliances.”

» PRACTICE POTENTIAL:

It has been estimated that approximately 70% of all malocclusions are Class II. The majority of these have a constricted maxilla that is in normal position, a retrognathic mandible, a normal or short lower

face height, a large overjet and a deep overbite. The most common use for the Twin Block is to treat this type of malocclusion.

Early intervention with this technique will allow normal eruption patterns to occur and provide the correct environment for proper physiological balance between the jaws and soft tissues. The treatment of our patients at an early age, preferably in mixed dentition, is important not only from a facial standpoint, but also as it relates to the health of the TMJ. Children treated early with functional therapy routinely exhibit less signs and symptoms of TM dysfunction when a Class II correction is accomplished by repositioning the condyles downward and forward. Surely it makes more sense to correct a Class II orthopedically with a Twin Block in mixed dentition than to subject the patient during the teenage years to extractions, cervical headgear and/or orthopedic surgery. Unfortunately, too often patients are not given this option. Instead they are told not to treat the malocclusion early when functional appliances like the Twin Block are most effective, hut rather to wait until all the permanent teeth have erupted.

How can orthodontic clinicians justify sending teenagers for a surgical correction of a problem that could easily be solved in mixed dentition with a functional appliance like the Twin Block?

If you want to build your orthodontic practice, offer your patients early non-extraction, non-surgical orthodontic treatment. Given a choice, patients will always choose a non-extraction, nonsurgical approach.

» INDICATIONS:

The Twin Block Appliance, developed by the orthodontist, Dr. Bill Clark, is the most popular and versatile of all the functional appliances as it can be used to effectively treat the following situations:

- Class II division 1
- Class II division 2
- Class I open bite
- Class I closed bite
- Class III
- Lateral arch constriction
- Anterior/posterior arch length discrepancies
- TMJ dysfunction

The benefits of using functional appliances like the Twin Block are discussed on the following pages.

Developing balanced faces - In cases where the mandible is deficient, the advancement of the mandible has a positive effect on the patient's profile and face. Patients and parents alike constantly comment on how the facial profile is tremendously improved as a result of wearing the Twin Block for 7 to 9 months.

In patients that have a short lower face height and are over-closed vertically, the appliance can be used to increase the posterior vertical dimension by allowing the eruption of the lower first molars. This results in an increase in the lower face height and has a positive effect on the patient's face when viewed from the front or the side.

Making beautiful smiles - When a constricted maxillary arch is developed to a more normal sized arch, this improves the patient's smile. This is easily accomplished with a Twin Block by simply adding a midline screw to the upper block. Patients prefer to have proper size arches that result in broader, more pleasing smiles.

A non-surgical approach - When Twin Block treatment is initiated early, the skeletal correction of the bony discrepancies can be corrected non-surgically using this orthopedic approach. The majority of parents and children want non-surgical treatment.

A non-extraction technique - When the dental arches are developed to their proper shape and size using this functional orthopedic appliance, most malocclusions in mixed and early permanent dentition can be corrected without extraction.

Improvement of the airway - The widening of the maxillary arch with the midline screw of the upper block of the Twin Block results in the palate dropping and increasing the size of the nasal cavity. This helps the patient to breathe more easily through the nose and decreases the tendency towards mouth breathing.

Preventing snoring and obstructive sleep apnea - If the tongue falls back and partially blocks the airway during sleep, it can cause the patient to snore. When the tongue completely obstructs the airway for more than ten seconds, an apnea episode has occurred. If a patient has more than thirty of these episodes in a seven-hour sleep cycle, they are suffering from Obstructive Sleep Apnea. Apnea can be a life-threatening condition that can lead to hypertension, heart attacks and strokes.

Because the tongue is attached to the mandible at the genial tubercle bringing the mandible forward also brings the tongue forward helping to keep the airway clear. Early skeletal Class II correction of our younger patients with the Twin Block can move their mandibles and tongues permanently forward thus helping to prevent snoring and Obstructive Sleep Apnea.

» DESCRIPTION:

The Twin Block is a removable functional appliance that consists of two bite blocks (twin blocks), upper and lower, which interlock at 70 degrees. The two twin blocks are designed to interlock in such a

manner that the mandible is held in a more protrusive position. The repositioning of the mandible forward eliminates the overjet and, when acrylic is removed from the upper block, eruption of the lower first molars occurs eliminating the overbite.

In mixed dentition, the lower molars will usually erupt passively. But in the permanent dentition, the lower molars usually need to be actively erupted using vertical elastics (1/8" 3 1/2 oz.). The vertical elastics are attached from a hook soldered to the clasp on the maxillary first molar to a buccal hook bonded to the lower first molar.

The Twin Block Appliance is worn until the overjet and overbite are corrected. When that occurs, the first molars will be in contact and the maxillary and mandibular incisors will be nicely coupled. To ensure that the patient does not have a dual bite, the appliance is worn a minimum of 7 to 9 months. When the patient's bite is stable, he should not he able to retrude the mandible without experiencing some discomfort. The advancement of the mandible results in the correction of the Class II molar relationship to Class I.

Once the first phase of treatment is completed, i.e. the case is at the desired vertical and AP position, it is necessary to place a Phase 2 or "Support Appliance." The aim of this phase of treatment is to retain the corrected incisor relationship until the posterior segments are in full occlusion (usually 4 to 6 months) and is continued for an additional 3 to 6 months to allow for functional re-orientation of the muscular complex. An upper removable appliance with a steep anterior inclined guide plane is used. The lower appliance is left out at this stage.

Phase 1:
Active Appliance Treatment

Clark Delta Clasps or Adam's

Clasps are used for retention and are attached to the first primary molars and first permanent molars in the mixed dentition. If you do not have first primary molars or first bicuspids, it would be better to delay the treatment as there would not be adequate retention for the upper block.

A Midline screw is used for lateral expansion of the maxillary arch to accommodate an advancing mandibular arch. Ideally, the midline screw is used when minimal expansion of the maxillary arch is required (4 to 5 mm.).

A Labial bow can be used to de-torque maxillary incisors that are flared.

The Upper Block covers the second bicuspid, first molar and second molar. Angled at 70 degrees from mesial of second bicuspid, it is designed to interlock with the lower block. The upper block must be at least 5 to 6 mm. thick. If it is not, adjusting it to allow for the eruption of the lower first molars will destroy the interlocking effect of the two blocks. It is vital to the success of the Twin Block treatment that the lower block is held ahead of the upper block at all times. If the patient is a mouth breather and the lower jaw falls back at night, the treatment will not be successful. In cases like this, it will be necessary to use vertical elastics (1/8" 3 1/2 oz.) between the upper and lower blocks at night.

Parts of Lower Block

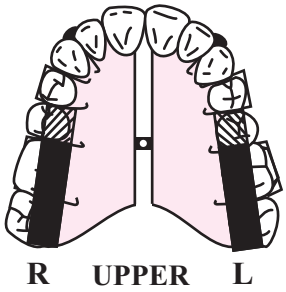
Clark Delta Clasps or Adam's Clasps are used on the lower first primary molars in early mixed dentition or lower first bicuspids in late mixed dentition. If the primary molars are not going to be present for 7 to 9 months or the first bicuspids have not erupted, then treatment with the Twin Block should be delayed. These teeth are critical for proper retention of the lower block.

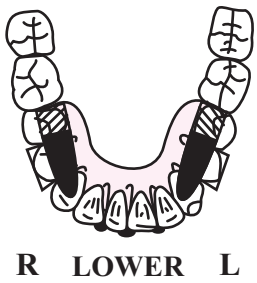
Interdental Clasps, 1 mm. ball-ended, are sometimes placed distal to the lower lateral incisors for additional retention.

A Labial Bow is used to de-torque flared lower incisors. The labial bow is also used to help prevent flaring of lower incisors which is one of the problems that occurs with all functional appliances including the Twin Block. It is used routinely in mixed dentition for additional retention, in case the primary molars are lost prematurely.

THE PRACTICE BUILDING BULLETIN

C-TYPE 1

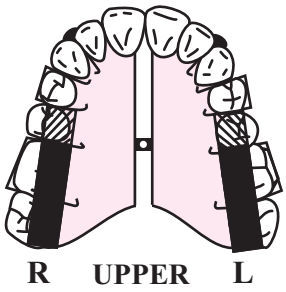


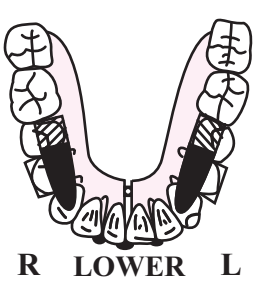


Standard Twin Blocks-Class II Div I
(with good arch form)

- Adams or Delta Clasps, and Anterior Ball clasps for good retention
- Twin Blocks, at a 70º angle, to advance mandible
- Upper Midline Screw: so upper arch can accomodate lower arch in advanced position

C-TYPE 2

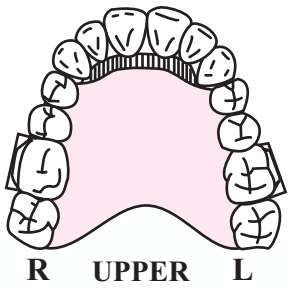


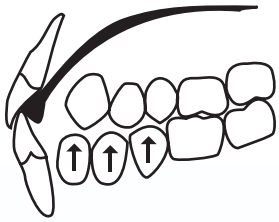


Standard Twin Blocks-Class II Div I
(with crowded lower arch)

- Adams or Delta Clasps, and Anterior Ball clasps for good retention
- Twin Blocks, at a 70º angle, to advance mandible
- Upper and lower Midline Screws

C-TYPE 3





Stage II - Support Phase

- Anterior Inclined Plane used to maintain the corrected AP and incisor relationship until buccal segments settle into full occlustion.

*Molars must be in contact to begin Stage II

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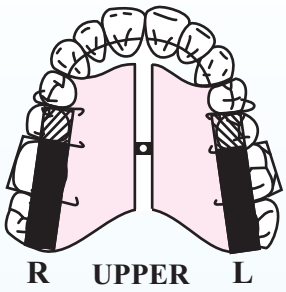
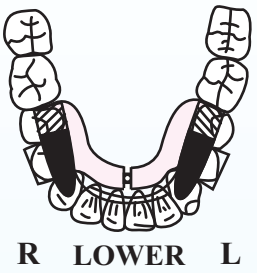


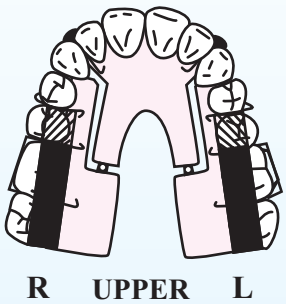


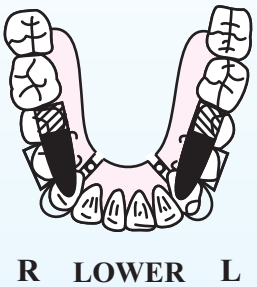
Class II Div II Twin Block

- Adams or Delta Clasps
- Twin Blocks, at a 70º angle, to advance mandible
- Upper and lower Midline Screws
- Lingual Springs to move anterior forward

To Open Bite: Reduce upper bite block as ilustrated above

C-TYPE 5





Class II Div II Twin Block "SAGGITAL"

- Adams or Delta Clasps, and Ball clasps
- Standard 70º Twin Blocks
- Adjust screws ¼ turn per week to advance anteriors

To Open Bite: Reduce upper bite block as ilustrated above

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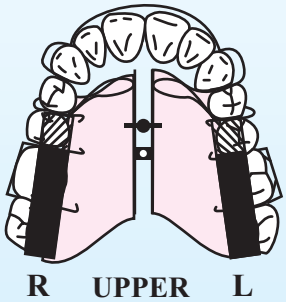
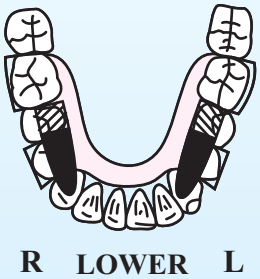




Twin Block to Close the Bite

- Adams or Delta Clasps
- Standard 70º Twin Blocks
- Tongue guard to prevent tongue thrust and act as Inclined plane to support the corrected incisor relationship
- Lower Acryclic extended to 6's with indicated clasps
- Acrylic relieved lingual to anteriors to encourage reduction of open bite

The Lower Block covers the first primary molar and two thirds of second primary molar. It interlocks with the upper block and must be at least 5 to 6 mm. thick to help maintain the forward positioning of the mandible. In mouth breathers, you may want to increase the size of the lower block or utilize vertical elastics (1/8" 3 1/2 oz.) between the upper and lower blocks at night to prevent the mandible from falling backwards.

Phase 2 - The Support Phase

The Twin Block II or the support phase appliance consists of an upper removable appliance with a steep anterior inclined guide plane. The lower appliance is left out at this stage. This inclined plane or ramp functions to hold the mandible in a protrusive position and helps prevent relapse. This plane sits just behind the six anterior teeth and extends from cuspid to cuspid. Every time the patient swallows, they are instructed to do so in such a manner that the lower incisors occlude anterior to the inclined plane. This ensures that the mandible is maintained in the desired forward position. The function of the removable Twin Block appliance would be to hold the mandible forward while allowing the lower posterior teeth, including the bicuspids and molars, to erupt and support the posterior occlusion. In mixed dentition, while waiting for the eruption of the bicuspids, this is frequently the appliance of choice for the support phase.

» TREATMENT PROCEDURES:

1. As always, proper appliance selection and application requires good diagnosis and treatment planning. It is recommended that the following records be taken:

- Complete medical and dental history
- Periodontal records
- X-rays (full series)
- Cephalometric x-ray and Analysis
- Models
- Photographs

Taking the time to obtain these records will also alert you to possible additional treatment that may be needed to assure that your patients receive the comprehensive care they deserve.

2. Take an accurate construction bite. When correcting an overjet in the mixed dentition, the construction bite is taken with the mandible held in a protrusive position. The lab will then advance the mandible the same amount when the Twin Block is constructed using the construction bite as a guide. For horizontal growers the bite is taken with the mandible advanced 6 mm. For vertical growers in permanent dentition, the mandible is advanced 4 mm. After three months, if the patient still has an overjet, the mandible may be advanced another 3 mm. by adding tooth colored Triad to the anterior incline of the upper block. Except for making the proper diagnosis, the bite registration is the most important thing the clinician must do correctly. This will be discussed in greater detail in the lab requirement section of this article.

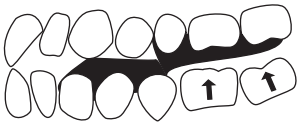
3. Upon delivery of the appliance, the clasps should be adjusted to hold the appliance securely. It should he explained to the patient that Twin Blocks are a 24-hour-a-day appliance. They are even to eat with the appliance in place.

4. Adjustment of the occlusal planes:

A. In cases with a deep overbite the upper block should he slightly trimmed occlusodistally to leave the lower molars 1 mm. clear of the occlusion so as to allow for eruption. This is usually done at the first visit, with subsequent reductions performed, as necessary until the proper vertical relationship is established.

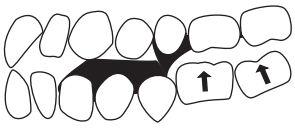
To Reduce Deep Overbite

Step 1



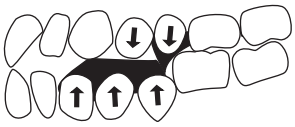
Trim upper bite block occlusodistally to encourage eruption of lower molars.

Step 2



Continue gradual upper bite block reduction over period of several months until molars are in occlusion, then...

Step 3



Trim blocks gradually in premolar region to allow them to erupt into occlusion.

B. In cases with reduced overbite (or open bites) it is very important that NO trimming is done on the blocks. In these cases, all posterior teeth must then remain in contact with the blocks to PREVENT eruption of the posterior teeth.

5. Appointment Scheduling:

1st Appointment - delivery of the appliances and patient instruction. Adjustment of occlusal planes above. One week later - adjust the bite blocks if the lower molars have erupted into contact.

Arch development - have patient begin expansion screw activation at one turn per week.

One-month intervals - check adjustments. Watch for proper vertical, lateral, and AP (anterior/posterior) development.

6. Once the first phase of treatment is completed, i.e. the case is at the desired vertical and AP position, it is necessary to place a Phase 2 or "Support Appliance."

7. Once you have corrected the patient's orthopedic (functional)

problem, it can be determined whether they will need to continue with further treatment using a fixed appliance for final leveling, rotation, or alignment of individual teeth.

» ADJUSTMENT TIPS:

1. Prior to delivery of the appliance, we recommend the placement of elastic separators between the lower first molars and its adjacent teeth. This will break the contacts and allow for rapid eruption of the lower molars.

2. Once the appliance has been checked for a comfortable fit, it is important to relieve the lower appliance slightly lingual to the lower incisors. This will avoid gingival irritation as the appliance settles in during the first few days.

3. Arch development in Class II constricted arches: The upper appliance should be expanded 1 turn weekly as the mandible advances so that a proper buccal/lingual posterior relationship will be achieved at the end of treatment. Care should be taken not to over expand the maxilla in these cases.

4. An overjet of up to 6 mm. can typically be corrected without re-activating the twin blocks, but overjets greater than 6 mm. normally require increased activation by the addition of cold cure acrylic to the anterior incline of the upper block during the course of treatment.

5. To correct the overbite ortho-pedically, it will be necessary to trim 1 to 2 mm. from the upper block to allow the lower first molars to passively erupt. Removal of excess acrylic may encourage a lateral tongue thrust habit that would slow down the eruption of the lower molars. As with all functional appliances, the vertical correction is slower than the sagittal correction.

» CONTRAINDICATIONS AND CONCERNS:

The main objective of Class II treatment is to properly relate the mandible to the maxilla in three dimensions: transversely, antero-posteriorly and vertically. For this to be accomplished, you need to have the correct position of the maxilla first.

1. The maxilla must be the proper width transversely. If the maxilla is not developed properly in the transverse direction when the mandible is advanced, the posterior teeth will be in buccal cross-bite and the case will not he stable. The width between the first molars at the gingival margin ideally should be 34 to 36 mm. in permanent dentition. If the maxillary arch is constricted, then a midline screw should be placed in the upper block to help develop the constricted arch to a more normal width. The patient is instructed to turn the key two times (each turn 1/4 mm.) per week until the desired amount of arch development has been achieved.

2. Ensure that there is no skeletal or facial asymmetry. Asymmetry is often seen in patients that have a unilateral cross-bite. This occurs because most unilateral cross-bites are caused by an under-developed maxilla and an occlusal interference that causes the mandible to shift to one side. When this happens, one condyle is positioned too far posteriorly and is usually the side with the most TMJ symptoms.

The other condyle is anteriorly displaced and can grow up and back. This can result in an increase in condylar length. This situation, where one condyle is short and the other longer, can cause a permanent facial asymmetry if it is not treated early. Frequently, the solution would be to expand the maxillary arch with a removable Schwarz Appliance with posterior occlusal pads or a fixed Banded or Bonded Hyrax Appliance. The expansion of the maxillary arch will ensure that the condyles will center themselves in the fossa and eliminate the facial asymmetry.

3.The maxillary incisors must be torqued correctly. If the incisors are flared, then ideally they should be de-torqued prior to the use of the Twin Block. However, under certain circumstances a labial bow can be placed on the upper block of the Twin Block that will help with the de-torquing of the incisors to a more normal inclination.

4. If the maxillary incisors are too vertical or lingually inclined, such as a Class II Div 2 case, this must be corrected first, prior to the fabrication of the Twin Block. The maxillary incisors must be in the correct position for the clinician to know where to place the mandible.

» CARE FOR THE APPLIANCE:

Twin Blocks should only be taken out for cleaning. Cleaning them after every meal is essential as food will collect under the appliances. They should be scrubbed thoroughly with a toothbrush and toothpaste, then rinsed with cool water.

The patient must be shown how to remove and insert the Twin Blocks by using the acrylic not the wires, to dislodge the appliance. Instructions should also be given on how and when to adjust any expansion screws.

» LAB REQUIREMENTS:

1. Accurate models with good lingual extensions on the lower model. Occlusal surfaces should be bubble free.

2. Bite registration is the most important thing the clinician must do correctly except for making the proper diagnosis. The construction bite represents exactly how the appliance should fit in the patient's mouth. This bite is used to establish the correct midline, vertical and horizontal relationship of the maxilla and mandible to each other. To accomplish this closely observe the following guidelines:

Take the construction bite with skeletal midlines properly aligned. Look for the maxillary and mandibular labial frenums and use them as a guide.

With the teeth slightly apart to eliminate the effects of any occlusal interference, use a red wax disposable marker to mark lines on the upper and lower incisors creating a visible guide for making sure that the bite is taken with the midlines aligned.

Have the patient practice opening wide and moving the mandible straight and forward using a hand mirror to ensure that the lines on the incisors stay properly aligned. It is important that the patient move the mandible straight and forward with no deviation to the right or left that could possibly cause TM dysfunction.

In cases of moderate deep overbites (approx. 5 mm.), the construction bite should be taken with approximately a 2 mm. space between upper and lower incisors. In cases with an excessive deep overbite (approx. 9 mm.), the construction bite should be taken approximately end to end with no space between upper and lower incisors. Regardless of all other parameters, the construction bite must be taken with 5 to 6 mm of space between the premolars to allow for adequate interlocking of the upper and lower blocks.

Depending on the degree of overjet, the patient's growth pattern and age, the bite should be taken so that it advances the mandible between 4 to 6 mm. Vertical growers or adult patients should only be advanced 4 mm. Horizontal growers or mixed dentition patients can be advanced up to 6 mm. **It is important to check the completed construction bite by placing it back on the working models.** Check the bite for proper midline, AP, and vertical correction and then carefully wrap the bite separately for shipment.

3) A complete prescription. The Twin Block is a very versatile appliance. It can be designed with many different clasps, springs, and expansion screws. So it is very important to give the lab your exact specifications

» SUPPLY LIST:

- ❑ Acrylic Burs*
- ❑ Acrylic Polishing Burs*
- ❑ Acrylic Repair Kit*
- ❑ Pressure Pot*
- ❑ 139 Bird Beak Pliers*
- ❑ Three Prong Pliers*
- ❑ Wire Cutter*
- ❑ Per-Fect Bites*
- ❑ Base Plate Wax*
- ❑ Hot Water Bath*
- ❑ Expansion Screw Key*
- ❑ Stiff Robinson Brush*
- ❑ Retainer Brite*
- ❑ Sonic Appliance Cleaner*
- ❑ Patient Appliance Care Cd*
- ❑ Patient Calendar Booklets*
- ❑ Colored Retainer Cases*

*Available from Success Essentials, call 800-423-3270

» LAB FEES:

Lab fees for the Twin Block range from $187.50.00 to $275.00 per set (upper and lower Twin Blocks) depending upon design complexity.

» CUSTOMARY FEE RANGE:

$1800.00 to $6000.00 per case depending on the complexity and whether or not finishing will require full arch bracketing.

» INCOME POTENTIAL:

Starting just one twin block patient per month can add over $33,000 in gross production to your practice.

A study in the May '91 issue of The Journal of Clinical Ortho-dontics, pages 295-297, indicated that practices using functional appliances usually had a substantially higher gross income when compared to practices that do not offer this service to their patients.

Written by Dr. Brock Rondeau
Edited by Dr. Rob Veis.

» REFERENCES:

1. Clark, William. "Twin Block." The American Journal of Orthodontics. January 1988.
2. Clark, William. "Twin Block Technique Manual."
3. Clark. William. "The Twin Block Technique." The Functional Orthodontist. September-October 1992.
4. Rondeau, Brock. "Twin Block - Part 1." The Functional Orthodontist. March-April 1995.
5. Rondeau, Brock. "Twin Block - Part 2." The Functional Orthodontist. March-April 1996.
6. Rondeau, Brock. "Class II Malocclusions in Mixed Dentition." The Journal of Clinical Pediatric Dentistry. Vol. 19, Number 1, 1994.
7. Rondeau, Brock. "Straight Wire - Functional Appliances." Course Manual, 1995-1996.
8. Rondeau, Brock. "The Rick-A-Nator Appliance." The Functional Orthodontist. July-August 1990.
9. Frazor, Hugh. "An Overview of twin Block Appliance Therapy Applications: Part I" The Functional Orthodontics. March-April 1992.
10. Frazer, Hugh. "An Overview of Twin Block Appliance Therapy Applications: Part II." The Functional Orthodontist. May-June 1992.
11. Frazer, Hugh. "An Introduction to Modified Twin Block Appliance." The Functional Orthodontist. May-June 1994.

12. McNamara, J.A., Jr. "Components of Class Il Malocclusions in Children 8-10 Years of Age." Angle Orthodontics. 51:177-202, 1981.

13. Movers, R.E. et al. "Differential Diagnosis of Class II Malocclusions." American Journal of Orthodontics. 78:477-494, 1980.

14. Woodside. D.C., Metuxas, A., Altuna, G. "The Influence of Functional Appliance Therapy on Glenoid Vossa Remodeling." American Journal of Orthodontics. 92:181-98, 1987.

15. Altuna. G., Woodside, D.G. "Response of the Mid Face to Treatment with Increased Vertical Occlusal Forces. Treatment and Post Treatment Effects in Monkeys." Angle Orthodontics. 55:257-263,1985.

16. McNamara, JA. Jr., Bryan F.A. "Long Term Mandibular Adaptations to Protrusive Functions: An Experimental Study in Macaca Mulatta." American Journal of Orthodontics. 92:98-107, 1987.

17. McNamara, J.A. Jr. "Naso-Respiratory Function and Craniofacial Growth." Centre for Growth and Development, University of Michigan, Ann Arbor, Michigan, 1979.

18. Witzig, J., Spahl, T. "Clinical Management of Basic Maxillofacial Orthopedic Appliances." Volume III TMJ. C.V. Mosby Co., 1991.

19. McNamara, J.A., Brandon, W.L. "Orthodontic and Orthopedic Treatment in the Mixed Dentition." Needham Press Inc., Ann Arbor, Michigan, 1993.

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