

TWIN BLOCK: CLINICAL APPLICATIONS



PADHRAIG FLEMING



Barts and The London
School of Medicine and Dentistry

www.smd.qmul.ac.uk

TAURANGA 2019



Treatment Duration

Adult Orthodontics

Retention

Growing Wiser

Functional Appliances

Orthodontic Research Practice



Development of a core outcome set for orthodontic trials using a mixed-methods approach: protocol for a multicentre study

Kiki Tsichlaki^{1,2}, Kevin O'Brien³, Anna Juhl⁴, Zoe Markham⁵, Philip Benson⁶, Fiorella B. Colomo Salazar⁶ and Padraig S. Fleming²

TWIN BLOCK: CLINICAL USE

- Well-tolerated
- Predictable
- Co-operation (Yaqoob et al., 2011: 93%)
- Versatile: Vertical, Transverse, EOT and FAs
- No marketing/user groups/symposia
- Functional of choice 75% (Chadwick et al., 1998)



Fixed or Removable?

- Does not reflect international practice
- Compliance
- Partial integration with fixed
- Lateral Open Bites



Fixed or Removable?

• Herbst vs. Twin Block

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng,^a Jean Wright, MSc, BSc,^b Frances Conboy, MA, BA,^a YeWang Sanjia, BDS, MSc,^c Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng,^d Stephen Chadwick, BDS, FDSRCSEdin, MOrthRCSEng,^e Ivan Connolly, BDS, FDSRCPSGlasg, FFDRCSEng, MOrthRCSEng,^f Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng,^g David Birnie, BDS, FDSRCSEdin, FDS, MOrthRCSEng,^h Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng,ⁱ Nigel Harradine, MB, BS, BDS, FDSRCSEdin, MOrthRCSEng,^j David Lewis, BDS, FDS, DOrthRCSEng, FRSH,^k Cathy McDade, BDS, FDSRCSEdin, DOrthRCSEng,^l Laura Mitchell, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng,^m Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng,ⁿ Julian O'Neill, BDS, MSc, FFDRCSEng, MOrthRCSEng,^o Mike Read, BDS, FDSRCSEdin, DOrthRCSEng,^p Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^q Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^r Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^s and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng,^t Manchester, Chester, Portadown, Leeds, Portsmouth, Southbridge, Bristol, Bolton, Bradford, Derbyshire, Keating, Chesham, and Sunderland, United Kingdom



The aim of this study was to evaluate the effectiveness of Herbst and Twin-block appliances for established Class II Division I malocclusion. The study was a multicenter, randomized clinical trial carried out in orthodontic departments in the United Kingdom. A total of 215 patients (aged 11-14 years) were randomized to receive treatment with either the Herbst or the Twin-block appliance. Treatment with the Herbst appliance resulted in a lower failure-to-complete rate for the functional appliance phase of treatment (12.9%) than did treatment with Twin-block (33.6%). There were no differences in treatment time between appliances, but significantly more appointments (3) were needed for repair of the Herbst appliance than for the Twin-block. There were no differences in skeletal and dental changes between the appliances; however, the final occlusal result and skeletal discrepancy were better for girls than for boys. Because of the high cooperation rates of patients using it, the Herbst appliance could be the appliance of choice for treating adolescents with Class II Division 1 malocclusion. The trade-off for use of the Herbst is more appointments for appliance repair. (Am J Orthod Dentofacial Orthop 2003;124:128-37)

Fixed or Removable?

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng.^a Jean Wright, MSc, BSc.^a Frances Conboy, MA, BA.^a YeWang Sanjia, BDS, MSc.^a Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng.^a Stephen Chadwick, BDS, FDSRCSEdin, MOrthRCSEng.^a Ivan Connolly, BDS, FDSRCPSGlasg, FFDRCSiret, MOrthRCSEng.^a Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng.^a David Barrie, BDS, FDSRCSEdin, FDS, MOrthRCSEng.^a Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng.^a Nigel Hamadine, MB, BS, BDS, FDSRCSEdin, MOrthRCSEng.^a David Lewis, BDS, FDS, DOrthRCSEng, FRSH.^a Cathy McDade, BDS, FDSRCSEdin, DOrthRCSEng.^a Laura Mitchell, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng.^a Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng.^a Julian O'Neill, BDS, MSc, FFDRCSiret, MOrthRCSEng.^a Mike Read, BDS, FDSRCSEdin, DOrthRCSEng.^a Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng.^a

^aManchester, Chester, Portsmouth, Leeds, Portsmouth, Stourbridge, Bristol, Bolton, Bradford, Derbyshire, Kettering, Chesham, and Sunderland, United Kingdom


	Herbst	Twin Block
		
Duration Phase 1	6 months	11 months
Tx Duration	21 months	22 months
Attendances	20	16

Fixed or Removable?

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng.^a Jean Wright, MSc, BSc.^a Frances Conboy, MA, BA.^a YeWang Sanjie, BDS, MSc.^a Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng.^a Stephen Chadwick, BDS, FDSRCSEng, MOrthRCSEng.^a Ivan Connolly, BDS, FDSRCPSGlasg, FFDRCSirel, MOrthRCSEng.^a Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng.^a David Barrie, BDS, FDSRCSEng, FDS, MOrthRCSEng.^a Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng.^a Nigel Hamadine, MB, BS, BDS, FDSRCSEng, MOrthRCSEng.^a David Lewis, BDS, FDS, DOrthRCSEng, FRSH.^a Cathy McDade, BDS, FDSRCSEng, DOrthRCSEng.^a Laura Mitchell, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng.^a Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng.^a Julian O'Neill, BDS, MSc, FFDRCSirel, MOrthRCSEng.^a Mike Read, BDS, FDSRCSEng, DOrthRCSEng.^a Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^a and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng.^a

^aManchester, Chester, Portsmouth, Leeds, Portsmouth, Stourbridge, Bristol, Bolton, Bradford, Derbyshire, Kettering, Chesham, and Sunderland, United Kingdom

	Herbst	Twin Block
		
Extra appointments	4	1.5
Duration of extra appts	1 hour 18	8 minutes
Cost of appliance	€350	€80

Fixed or Removable?

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng.^a Jean Wright, MSc, BSc.^b Frances Conboy, MA, BA.^c YeWang Sanjie, BDS, MSc.^d Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng.^e Stephen Chadwick, BDS, FDSRCSEdin, MOrthRCSEng.^f Ivan Connolly, BDS, FDSRCPSGlasg, FDSRCStret, MOrthRCSEng.^g Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng.^h David Barrie, BDS, FDSRCSEdin, FDS, MOrthRCSEng.ⁱ Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng.^j Nigel Hamadine, MB, BS, BDS, FDSRCSEdin, MOrthRCSEng.^k David Lewis, BDS, FDS, DOrthRCSEng, FRSH.^l Cathy McDade, BDS, FDSRCSEdin, DOrthRCSEng.^m Laura Mitchell, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng.ⁿ Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng.^o Julian O'Neill, BDS, MSc, FDSRCStret, MOrthRCSEng.^p Mike Read, BDS, FDSRCSEdin, DOrthRCSEng.^q Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^r Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^s Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng.^t and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng.^u

^aManchester, ^bCheshire, ^cPortsmouth, ^dLeeds, ^ePortsmouth, ^fStourbridge, ^gBristol, ^hBolton, ⁱBraintree, ^jDerbyshire, ^kExeter, ^lCheshire, ^mSunderland, ⁿUnited Kingdom



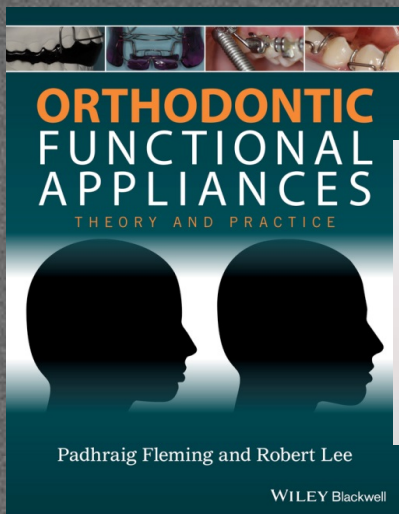
Fixed or Removable?

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng,^a Jean Wright, MSc, BSc,^a Frances Conboy, MA, BA,^a YeWang Sanjie, BDS, MSc,^a Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng,^a Stephen Chadwick, BDS, FDSRCSEdin, MOrthRCSEng,^a Ivan Connolly, BDS, FDSRCPSGlasg, FDSRCSEdin, MOrthRCSEng,^a Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng,^a David Barrie, BDS, FDSRCSEdin, FDS, MOrthRCSEng,^a Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng,^a Nigel Haradine, MB, BS, BDS, FDSRCSEdin, MOrthRCSEng,^a David Lewis, BDS, FDS, DOrthRCSEng, FRSH,^a Cathy McDade, BDS, FDSRCSEdin, DOrthRCSEng,^a Laura Mitchell, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng,^a Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng,^a Julian O'Neill, BDS, MSc, FDSRCSEdin, MOrthRCSEng,^a Mike Read, BDS, FDSRCSEdin, DOrthRCSEng,^a Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^a Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^a Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^a and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng^a
Manchester, Chester, Portadown, Leeds, Portsmouth, Slough, Bristol, Bolton, Bradford, Derbyshire, Kettering, Cheshire, and Sunderland, United Kingdom

• HERBST better for:

- Speech
- Sleep
- Rubbing
- Social interaction
- Schoolwork



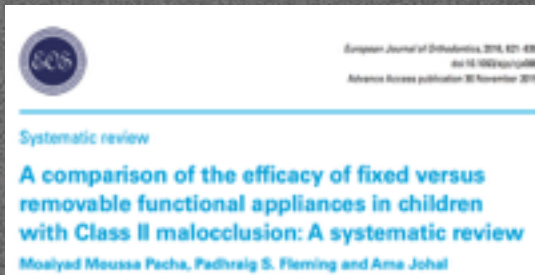
Fixed or Removable?

Effectiveness of treatment for Class II malocclusion with the Herbst or Twin-block appliances: A randomized, controlled trial

Kevin O'Brien, PhD, MSc, BDS, FDS, DOrthRCSEng,^a Jean Wright, MSc, BSc,^b Frances Corbey, MA, BA,^a YeWang Sangtae, BDS, MSc,^c Nicky Mandall, PhD, BDS, FDSRCSEng, MOrthRCSEng,^a Stephen Chadwick, BDS, FDSRCSEdin, MOrthRCSEng,^a Ivan Connolly, BDS, FDSRCPSGlasg, FFDRCSirel, MOrthRCSEng,^d Paul Cook, MSc, BChD, FDSRCPSGlasg, LDS, FDS, DOrth, MOrthRCSEng,^a David Birnie, BDS, FDSRCSEdin, FDS, MOrthRCSEng,^b Mark Hammond, MSc, BDS, FDS, RCPSGlasg, MOrthRCSEng,^d Nigel Harradine, MB, BS, BDS, FDSRCSEdin, MOrthRCSEng,^d David Lewis, BDS, FDS, DOrthRCSEng, FRSH,^e Cathy McDade, BDS, FDSRCSEdin, DOrthRCSEng,^d Laura Mitchell, MDS, BDS, FDSRCPSGlasg, MOrthRCSEng, DOrthRCSEng,^a Alison Murray, BDS, MSc, FDSRCPSGlasg, MOrthRCSEng,^a Julian O'Neill, BDS, MSc, FFDRCSirel, MOrthRCSEng,^a Mike Read, BDS, FDSRCSEdin, DOrthRCSEng,^d Stephen Robinson, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^b Dai Roberts-Harry, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^a Jonathan Sandler, MSc, BDS, FDSRCPSGlasg, MOrthRCSEng,^a and Ian Shaw, PhD, MScD, BDS, FDS, DOrthRCSEng^a
Manchester, Chester, Portadown, Leeds, Portsmouth, Stockbridge, Bristol, Bolton, Bradford, Derbyshire, Kettering, Cheshire, and Sunderland, United Kingdom

- Twin Block better for clinicians?
- BUT
- HERBST better for patients?

Fixed or Removable?



Objectives: To systematically compare the efficacy of fixed and removable functional appliances in Class II malocclusion in terms of morphological and patient-centred outcomes.

Search methods: A comprehensive search of electronic databases without language or time restrictions was undertaken, applying a pre-specified search strategy. Supplementary electronic searching of orthodontics journals and references list of included studies was performed.

Selection criteria: Randomized (RCTs) and controlled (CCTs) clinical trials involving children under 16 years with Class II malocclusion and overjet more than 5 mm were included.

Data collection and analysis: A range of clinician- and patient-centred outcomes were evaluated and compared. Risk of bias assessment was carried out using the Cochrane Collaboration tool.

Results: Only four clinical trials were found to meet our criteria, of which two were RCTs, comparing the Herbst and the Twin Block appliances. Two further CCTs, compared the Activator to the Forsus and the Twin Force Bite Corrector, respectively. One study was assessed to be at unclear and the remaining at high risk of bias, precluding meta-analysis. There was also significant clinical heterogeneity in terms of methodology, type of intervention and the measured outcomes. Both modalities were effective in correcting the overjet with little differences found in cephalometric changes and a shortage of data concerning patient-centred outcomes.

Conclusion: There is little evidence concerning the relative effectiveness of fixed and functional appliances or in relation to patient experiences and perceptions of these treatment modalities. Further well-designed clinical trials assessing the relative merits of both clinician- and patient-centred outcomes are needed.

- Lack of high-quality studies
- Bias
- Lacking in patient focus
- More needed

Hanks Herbst



Hanks Herbst



Hanks Herbst





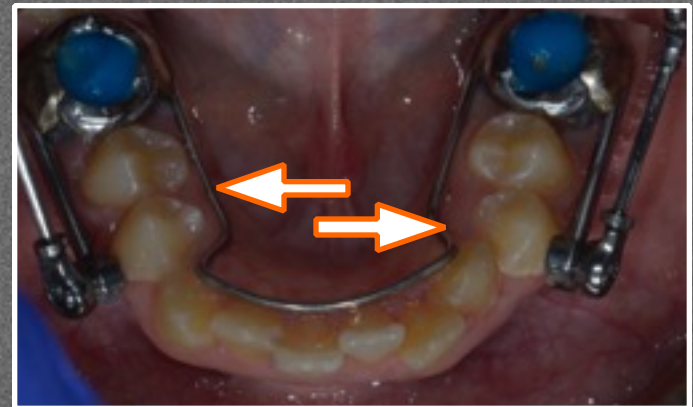
Hanks Herbst vs TB

- Ongoing RCT
- Recruitment complete
- Objective and patient-centred outcomes



Clinical impressions:

- Few breakages
- No disengagement
- Impingement on lingual mucosa
- Chairside time

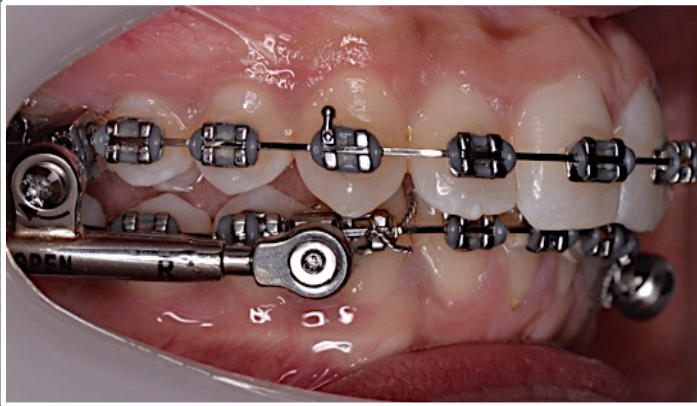
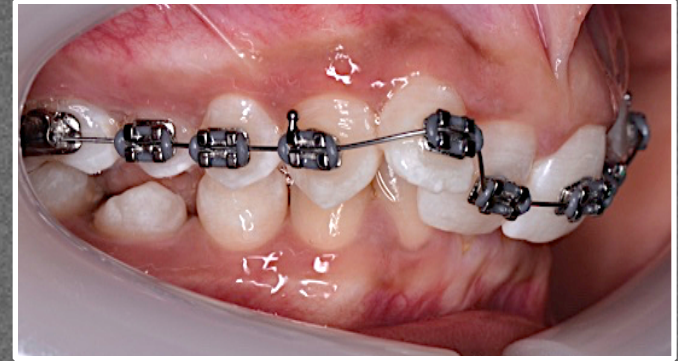


Hanks Herbst

- Not a panacea
- Breakages/harms problematic
- Versatility
- Integration with fixed limited
- Patient views?



Fixed Corrector: PowerScope



Class II: 14-year-old female



Class II: 14-year-old female

Problem List

- Skeletal II
- Skeletally-mature
- Retrusive profile
- Molar II bilaterally
- 180 degree rotation 15
- Rotation 35 and 45

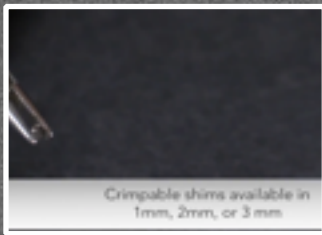




Screw acts as "fourth wall"
to hold appliance in place



260gm of force when properly activated



JUNE 23RD 2017

DECEMBER 5TH 2017

APRIL 17TH 2018



JANUARY 22ND 2019

FEBRUARY 26TH 2019

APRIL 10TH 2019



Class II: 14-year-old female



My Practice

**PERSEVERANCE:
IF AT FIRST YOU
DON'T SUCCEED,
TRY, TRY AGAIN**

PICTUREQUOTES.COM

- More Class II correctors: Herbst/PowerScope
- Persevering with Twin Block
- Trying to improve predictability with Twin Block

Twin Block

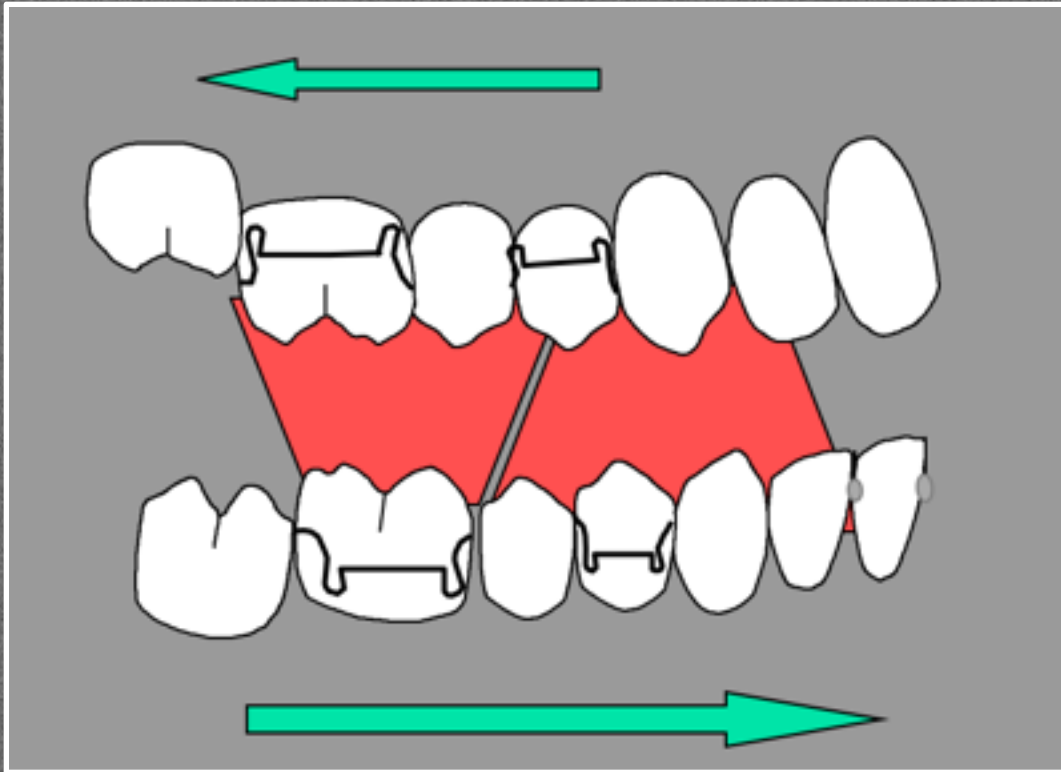


27th JAN



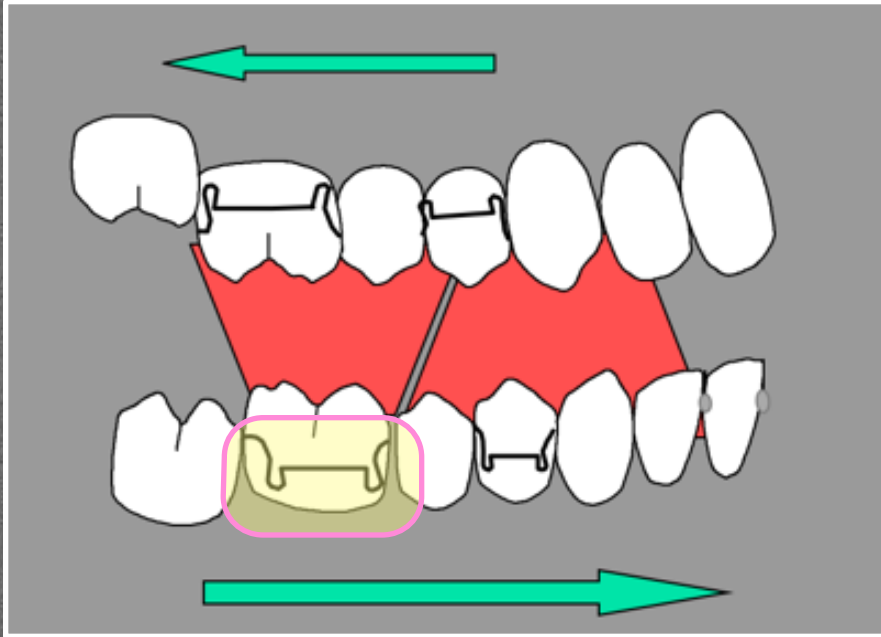
- 12-YEAR-OLD MALE
- SKELETAL II MILD/MOD
- MANDIBULAR RETROGNATHIA
- AVERAGE VERTICAL PROPORTIONS
- LIP TRAP
- INCREASED OVERJET (12MM)
- LOWER CROWDING

TWIN BLOCK: CLINICAL USE



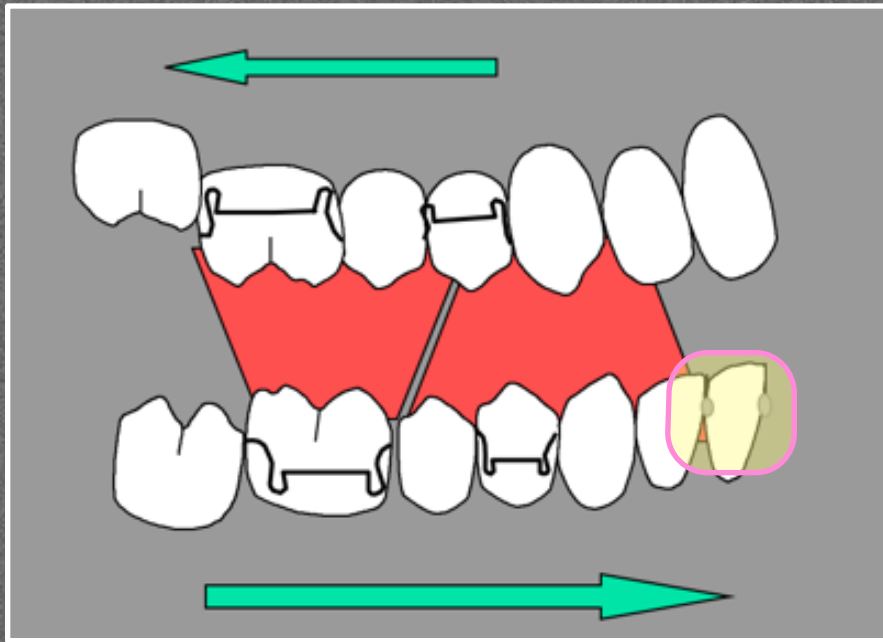
- Simple
- Minimal wirework

TWIN BLOCK: CLINICAL USE



- Crib lower 6s:
- Fracture frequently
- 35/56 (Gill et al. 2007)
- Open bites close

TWIN BLOCK: CLINICAL USE



- Ball-ended clasps:
 - Simple
 - Lower incisors will advance irrespective



TWIN BLOCK: CLINICAL USE

Twin Block appliance with acrylic capping does not have a significant inhibitory effect on lower incisor proclination

Mark Cornelis van der Plas^a; Krista Ingeborg Janssen^b; Nikolaos Pandis^c; Christos Livas^d

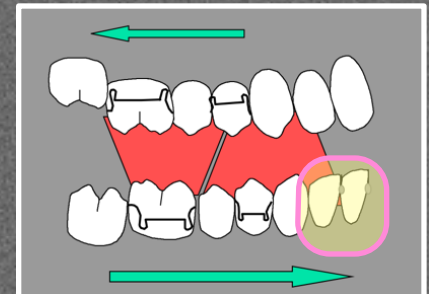
ABSTRACT

Objective: To investigate the effect of acrylic capping, treatment duration, overjet, and lower incisor inclination on the posttreatment tooth position in patients treated with 2 Twin Block (TB) appliance versions.

Materials and Methods: Cephalograms of 56 patients with Class II malocclusion (21 boys, 35 girls; mean age before treatment [T1] = 12.5 years; standard deviation, 0.7) treated with a TB appliance with either acrylic capping or ball-ended clasps on lower incisors were retrospectively collected and traced. Lower incisor inclination (L1-GoGn, L1-GoMe, L1-MP) was measured at T1 and after TB appliance removal (T2). Regression analysis was performed to evaluate the effect on the lower incisor inclination of appliance type, overjet, lower incisor inclination at T1, and treatment duration after adjusting for baseline measurements.

Results: Appliance design was not a significant predictor for either incisor inclination measurement ($P < .05$). Pretreatment lower incisor inclination was the only factor significantly associated with final tooth inclination (L1-GoGn: $\beta = 0.57$, 95% confidence interval [CI] = 0.30, 0.84, $P < .001$; L1-GoMe: $\beta = 0.56$, 95% CI = 0.28, 0.84, $P < .001$; L1-MP: $\beta = 0.46$, 95% CI = 0.17, 0.75, $P = .003$). There was weak evidence that treatment duration excluding L1-MP (95% CI = -1.85, -0.02; $P = .045$) and overjet might be associated with inclination of lower incisors at T2.

Conclusions: TB appliance design with acrylic capping on lower incisors appears not to significantly control incisor proclination. Pretreatment lower incisor inclination may be significantly associated with tooth inclination after active TB treatment and should be considered in treatment planning. (*Angle Orthod* 2017;87:513-518)



TWIN BLOCK: CLINICAL USE



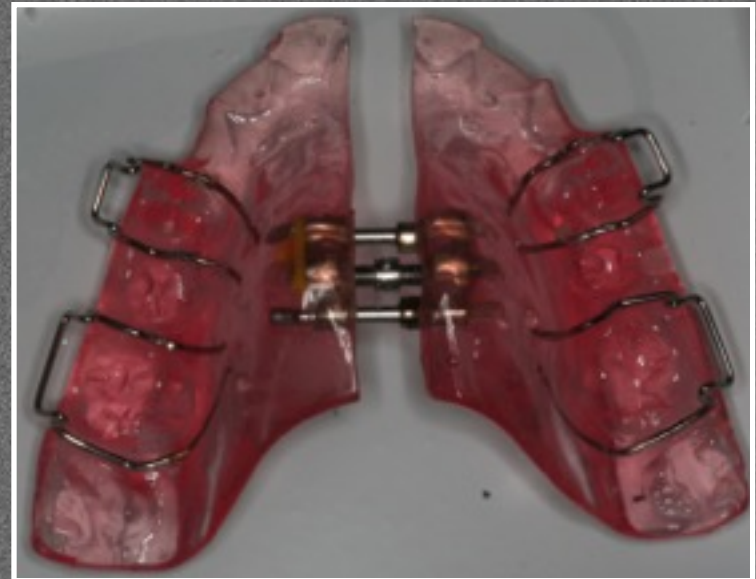
- 2-4mm anterior opening
- 6mm in premolar region

MANAGEMENT

- Review 1: 1 month: TRANSVERSE EXPANSION
- Review 2: 3 months
- Review 3: 6 months
- Review 4: 9 months
- Review 5: 12 months

Why expand at 1 month?

- Compliance
- Burden
- Fit



30th JUNE (5 months)



Rapid Class II correction

- 10mm at molar and incisor
- 2mm/month
- Dental and skeletal



Rapid Class II correction

- 2mm/month
- Dental and skeletal



Rapid Class II correction

- Condylar Adaptation: *Maximal vs One-step*
- Positive reinforcement: Patient and Operator
- Compliance



Incremental versus maximum bite advancement during twin-block therapy: a randomized controlled clinical trial.

Am J Orthod Dentofacial Orthop 2004; 126(5):583-8

AJ

Abstract

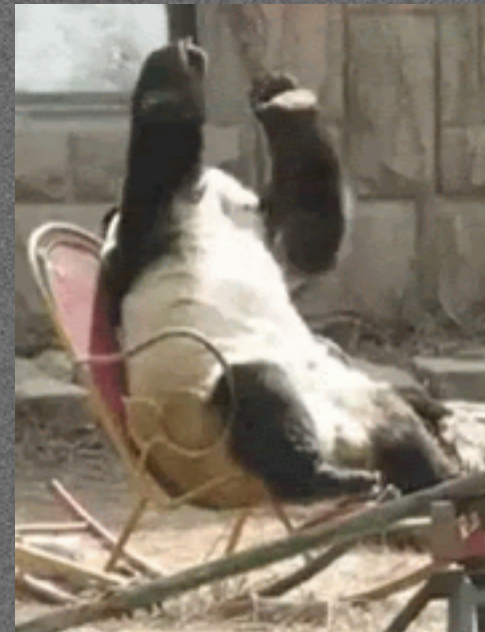
The aim of this study was to evaluate the effectiveness of incremental and maximum bite advancement during treatment of Class II Division 1 malocclusion with the Twin-block appliance in the permanent dentition. It was performed at 3 district general hospitals in the United Kingdom with 4 operators. Two hundred three patients, 10-14 years old, were randomized. Control patients had the initial bite taken edge-to-edge for appliance construction with a standard Twin-block. Experimental patients had 2 mm initial bite advancement and subsequent 2 mm advancements at 6 weekly intervals with a Twin-block appliance incorporating advancement screws. Data were collected at the start and the finish of Twin-block treatment. The use of incremental advancement of the Twin-block did not confer any advantages in terms of process and outcome of the treatment. However, patient compliance was influenced by operator and patient age. The duration of treatment was influenced by operator and initial overjet. Incremental bite advancement produced no advantages over maximum advancement.



LATERAL OPEN BITES



- A problem?



LATERAL OPEN BITES

- Close spontaneously:
 - 6 weeks to 3 months
- Trimming or Tapering:
- Part-time wear:
 - Maintains A-P correction
- Complete withdrawal



How to ... manage the transition from functional to fixed appliances

P. S. Fleming, P. Scott & A. T. DiBiase

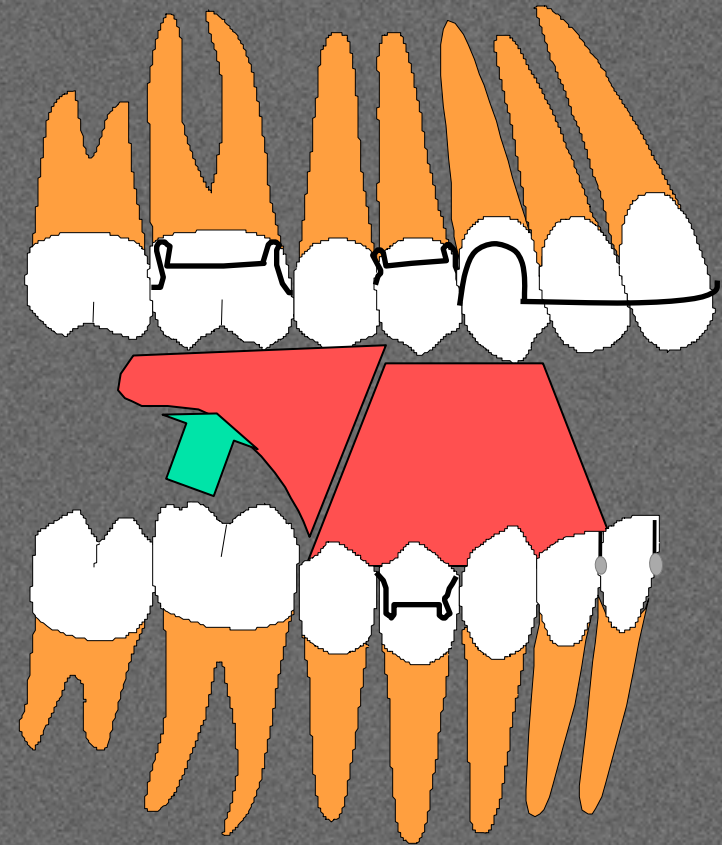
Pages 252-259 | Received 11 Aug 2006, Accepted 15 Apr 2007, Published online: 16 Dec 2014

Download citation <https://doi.org/10.1179/146531207225022311>

TRIMMING BLOCKS?



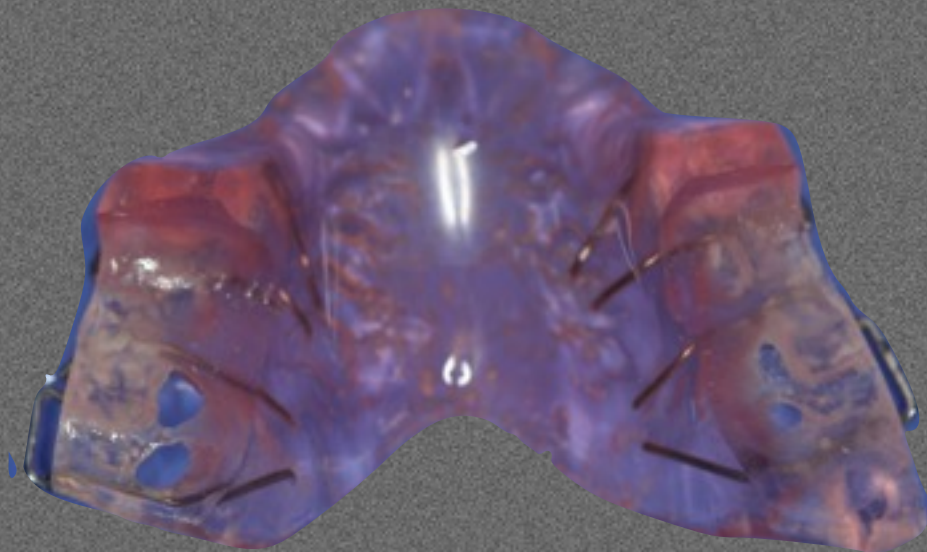
- Molar eruption
- Lower incisor proclination
- Stability
- Condylar support



30th JUNE



TWIN BLOCK: CLINICAL USE



30th JUNE (5 months)



6th OCT (8 months)



12th JAN (12 months)



DURATION: 12 MONTHS



- Stability

An extended period of functional appliance therapy: a controlled clinical trial comparing the Twin Block and Dynamax appliances

Robert T. Lee*, Emma Barnes*, Andrew DiBiase**, Ravichandram Govender* and Usman Qureshi***

*Department of Orthodontics, Bart's & The London NHSTrust, London, **East Kent Hospitals University NHS Foundation Trust, ***Department of Orthodontics, Q.M.U.L., London, UK

Correspondence to: Department of Orthodontics, Bart's & The London NHSTrust, New Road, Whitechapel, London, E1 1BB. E-mail: r.t.lee@qmul.ac.uk

SUMMARY The aim of this clinical trial was to compare the hard- and soft-tissue effects of 15 month full-time functional appliance therapy with Twin Block (TB) and Dynamax (Dx) appliances. The effects on both hard and soft tissue were analysed using cephalograms and three-dimensional optical surface laser scans. One hundred and three subjects with a class II division 1 malocclusion, and a minimum overjet of 7 mm were available for analysis following stratified randomization according to gender and age. Data was collected at the start of treatment, 15 month therapy, and after 3 month post-treatment observation. Statistical analysis was conducted using analysis of covariance. The results demonstrated both appliances corrected the overjet with significantly increased skeletal dimensional changes with the TB compared with the Dx with forward movement of pogonion of 5.2 mm (TB) and 0.7 mm (Dx) $P = 0.003$. In addition, significant changes occurred particularly in the vertical dimension where there was also an increase in total anterior face height in both groups (TB = 6.4 mm, Dx = 5.5 mm) and significant ($P = 0.003$) mandibular length changes were also observed (TB = 7.2 mm, Dx = 3.8 mm). The cephalometric soft-tissue changes were significantly different between the two appliances at soft-tissue pogonion (TB = 9.8 mm, Dx = 4.6 mm, $P = 0.001$). Laser scan three-dimensional changes showed significant difference in the lower labial sulcus region where forward movements were observed (TB = 8.2 mm, Dx = 6.2 mm; $P = 0.04$). Overall these changes appear to be greater and more stable than those achieved in a previous 9 month study.

DURATION: 12 MONTHS

- Unless obvious extraction case
- Occlusal stability
- Reduce length of transition
- Reduced need for adjuncts

An extended period of functional appliance therapy: a controlled clinical trial comparing the Twin Block and Dynamax appliances

Robert T. Lee*, Emma Barnes*, Andrew DiBiase**, Ravichandram Govender* and Usman Qureshi***

*Department of Orthodontics, Bart's & The London NHS Trust, London. **East Kent Hospitals University NHS Foundation Trust. ***Department of Orthodontics, Q.M.U.L., London, UK

Correspondence to: Department of Orthodontics, Bart's & The London NHS Trust, New Road, Whitechapel, London, E1 1BB. E-mail: r.t.lee@gmul.ac.uk

SUMMARY The aim of this clinical trial was to compare the hard- and soft-tissue effects of 15 month full-time functional appliance therapy with Twin Block (TB) and Dynamax (Dx) appliances. The effects on both hard and soft tissue were analysed using cephalograms and three-dimensional optical surface laser scans. One hundred and three subjects with a class II division 1 malocclusion, and a minimum overjet of 7 mm were available for analysis following stratified randomization according to gender and age. Data was collected at the start of treatment, 15 month therapy, and after 3 month post-treatment observation. Statistical analysis was conducted using analysis of covariance. The results demonstrated both appliances corrected the overjet with significantly increased skeletal dimensional changes with the TB compared with the Dx with forward movement of pogonion of 5.2 mm (TB) and 0.7 mm (Dx) $P = 0.003$. In addition, significant changes occurred particularly in the vertical dimension where there was also an increase in total anterior face height in both groups (TB = 6.4 mm, Dx = 5.5 mm) and significant ($P = 0.003$) mandibular length changes were also observed (TB = 7.2 mm, Dx = 3.8 mm). The cephalometric soft-tissue changes were significantly different between the two appliances at soft-tissue pogonion (TB = 8.8 mm, Dx = 4.6 mm, $P = 0.001$). Laser scan three-dimensional changes showed significant difference in the lower labial sulcus region where forward movements were observed (TB = 8.2 mm, Dx = 6.2 mm; $P = 0.04$). Overall these changes appear to be greater and more stable than those achieved in a previous 9 month study.



How to ... manage the transition from functional to fixed appliances

P. S. Fleming, P. Scott & A. T. DiBiase

Pages 252-259 | Received 11 Aug 2006, Accepted 15 Apr 2007, Published online: 16 Dec 2014

Download citation <https://doi.org/10.1179/146531207225022311>

12th JAN



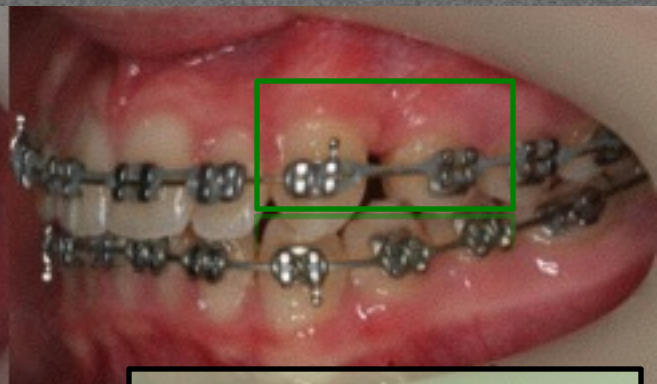
12th JAN



23rd FEB



15th APR



29th JUNE



Avoid Class II
elastics

14th SEP



9th NOV



14th DEC



14th DEC



POSTERIOR CROSSBITE

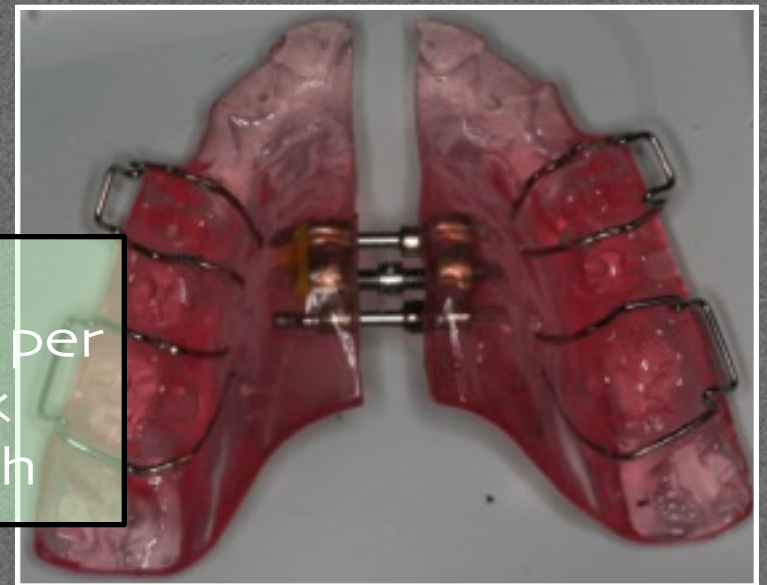


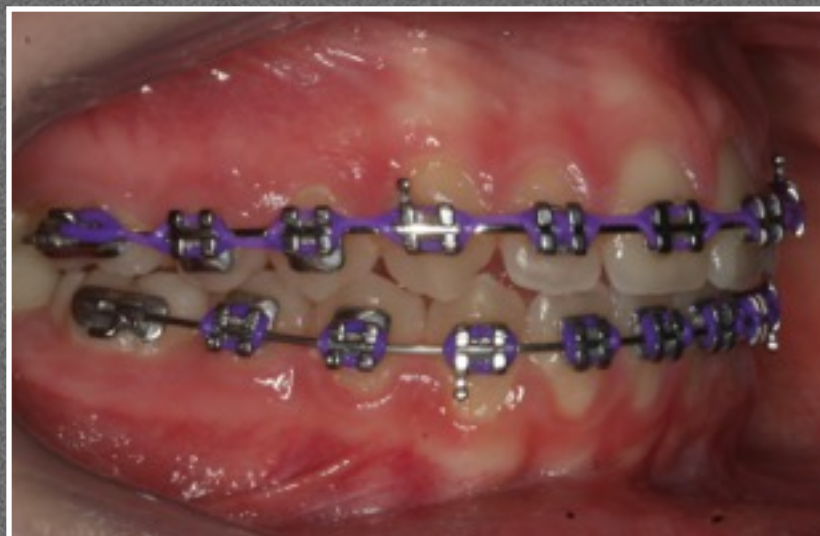
- 13-YEAR-OLD FEMALE
- SKELETAL II MILD
- AVERAGE VERTICAL PROPORTIONS
- INCREASED OVERJET (8MM)
- UNILATERAL CROSSBITE





- 0.2 to 0.25mm per turn: 2 per week
- Start at 1 month







PROCLINED UPPER ANTERIORS



- 12-YEAR-OLD FEMALE
- MODERATE SKELETAL II
- AVERAGE VERTICAL PROPORTIONS
- INCREASED OVERJET (13MM)
- PROCLINED MAXILLARY INCISORS

SNA	79°
SNB	72°
ANB	7°

AptNP	-2mm
PogNP	-8mm
AO:BO	-5mm

MMPA	26°
FMPA	24°
LAFH%	55%

UIMx	125°
LIMn	96°
LiAPog	-2mm

U Lip E line	-2mm
L Lip E line	-3mm



LABIAL BOW?

Original Article

Use of the Clark Twin Block functional appliance with and without an upper labial bow: a randomized controlled trial

Omar Yaqoob^a; Andrew T. DiBiase^b; Padhraig S. Fleming^c; Martyn T. Cobourne^d

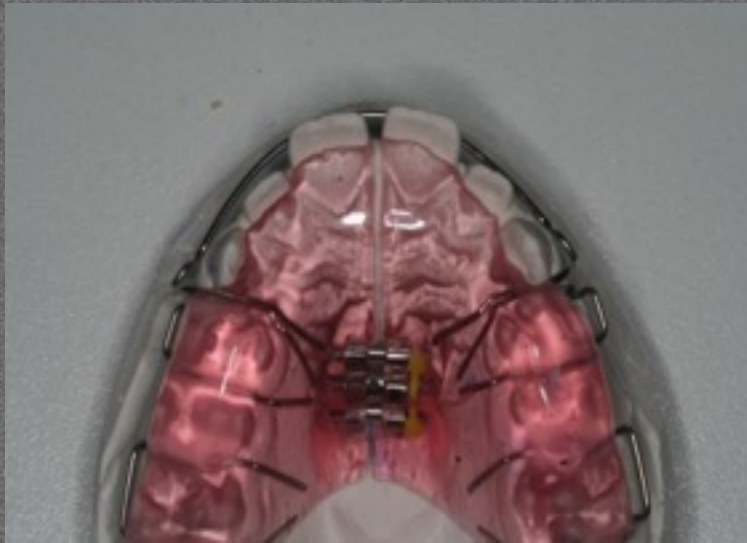
ABSTRACT

Objectives: To compare dentoalveolar and skeletal changes in two groups of Class II division 1 patients treated with different designs of Clark's Twin Block (CTB), with (Group 1) or without (Group 2) an upper labial bow.

Materials and Methods: A randomized controlled trial was conducted in the Department of Orthodontics at the East Kent Hospitals University NHS Foundation Trust, UK. Sixty-two white subjects (aged 10–14 years at the start of treatment, minimum overjet > 6 mm, molar relationship at least ½ unit Class II) were recruited. Subjects were divided into age- and sex-matched pairs, were randomly allocated to treatment with either appliance design, and were treated for 12 months, at which time additional data were collected.

Results: Sixty participants were available for final data collection. The two groups were well matched with respect to age (mean 12.5 years in Group 1; 12.3 years in Group 2). No statistical difference was noted between groups for any dentoalveolar or skeletal variables measured. Both groups experienced a reduction in overjet as a result of maxillary incisor retroclination, mandibular incisor proclination, and forward positioning of the pogonion. Maxillary molar distalization, mandibular molar mesialization, and ANB reduction also occurred in both groups.

Conclusions: The addition of a maxillary labial bow to the CTB has no influence on dentoalveolar or skeletal changes, or on rate of overjet reduction, in relation to appliance therapy. (*Angle Orthod.* 2012;82:363–369.)



Use of the Clark Twin Block functional appliance with and without an upper labial bow: a randomized controlled trial

DURATION (12 MONTHS) AND WIREWORK

An extended period of functional appliance therapy: a controlled clinical trial comparing the Twin Block and Dynamax appliances

Robert T. Lee*, Emma Barnes*, Andrew DiBiase**, Ravichandram Govender* and Usman Qureshi***

*Department of Orthodontics, Bart's & The London NHS Trust, London, **East Kent Hospitals University NHS Foundation Trust, ***Department of Orthodontics, Q.M.U.L., London, UK

Correspondence to: Department of Orthodontics, Bart's & The London NHS Trust, New Road, Whitechapel, London, E1 1BB. E-mail: r.t.lee@qmul.ac.uk

SUMMARY The aim of this clinical trial was to compare the hard- and soft-tissue effects of 15 month full-time functional appliance therapy with Twin Block (TB) and Dynamax (Dx) appliances. The effects on both hard and soft tissue were analysed using cephalograms and three-dimensional optical surface laser scans. One hundred and three subjects with a class II division 1 malocclusion, and a minimum overjet of 7 mm were available for analysis following stratified randomization according to gender and age. Data was collected at the start of treatment, 15 month therapy, and after 3 month post-treatment observation. Statistical analysis was conducted using analysis of covariance. The results demonstrated both appliances corrected the overjet with significantly increased skeletal dimensional changes with the TB compared with the Dx with forward movement of pogonion of 5.2 mm (TB) and 0.7 mm (Dx) $P = 0.003$. In addition, significant changes occurred particularly in the vertical dimension where there was also an increase in total anterior face height in both groups (TB = 6.4 mm, Dx = 5.5 mm) and significant ($P = 0.003$) mandibular length changes were also observed (TB = 7.2 mm, Dx = 3.8 mm). The cephalometric soft-tissue changes were significantly different between the two appliances at soft-tissue pogonion (TB = 9.8 mm, Dx = 4.6 mm, $P = 0.001$). Laser scan three-dimensional changes showed significant difference in the lower labial sulcus region where forward movements were observed (TB = 8.2 mm, Dx = 6.2 mm; $P = 0.04$). Overall these changes appear to be greater and more stable than those achieved in a previous 9 month study.



- Using appliance for a fixed period
- Not basing duration on overjet: 'Ignoring success but not failure'
- Components/wirework doesn't affect growth/skeletal change
- Rarely incorporate labial bow
 - Aesthetics
 - Complexity





PROCLINED LOWER ANTERIORS



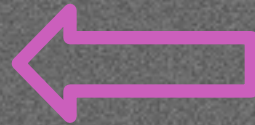
12-year-old female
8mm overjet
Spacing LLS



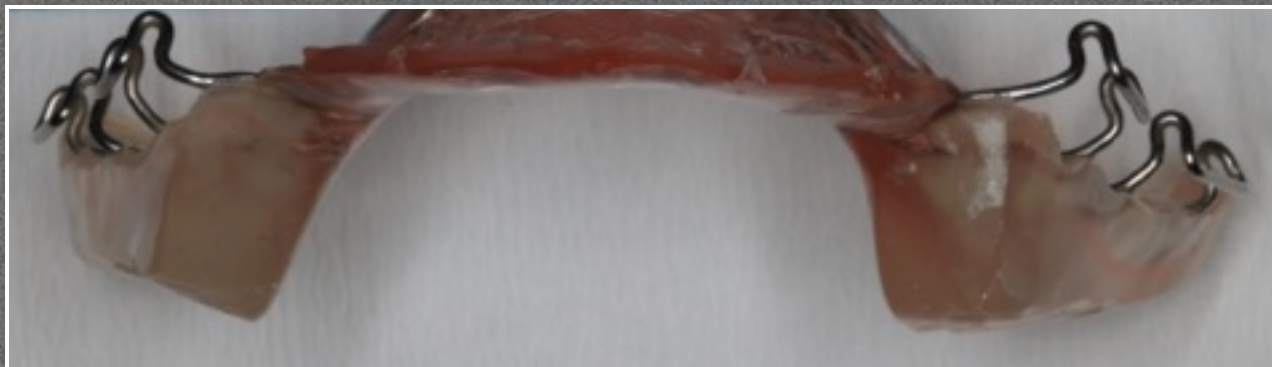
PROCLINED LOWER ANTERIORS

- Why correct?
- Full occlusal correction
- 'Long' lower arch: Molar correction





3-MONTH REVIEW







10 MONTHS



PRE-TREATMENT



LOWER SPACING MOLAR CORRECTION



10 MONTHS

POST-TREATMENT



RETROCLINED UPPER ANTERIORS

CLASS II DIVISION 2

- Decompensate ULS
- Concurrent or Prior (ELSAA)?
 - Bite registration
 - Maturity
 - Treatment length





20th OCT, 2014

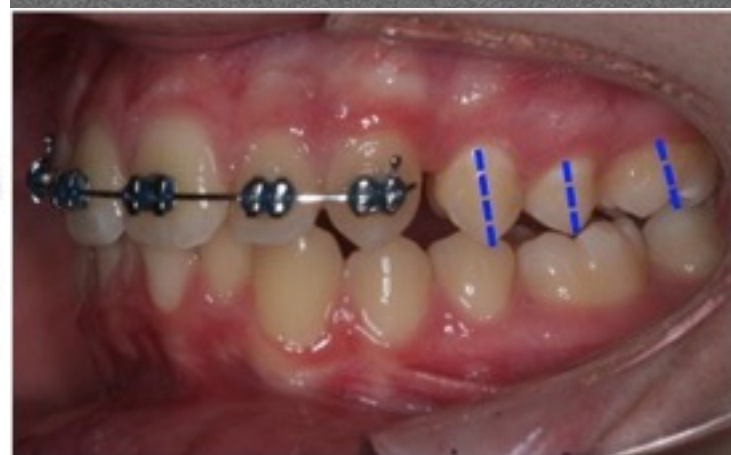
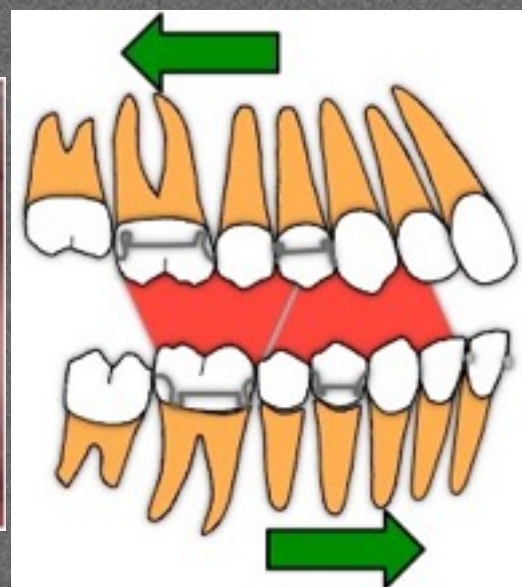
- 14-YEAR-OLD MALE
- MODERATE SKELETAL II
- AVERAGE VERTICAL PROPORTIONS
- ASYMMETRIC MOLAR RELATIONSHIPS
- INCREASED OVERBITE



30th JUNE 2015



20th OCT 2014





14th SEP, 2015

17th NOV, 2015



26th JAN, 2016



20th MARCH, 2017



12-MONTH RECALL



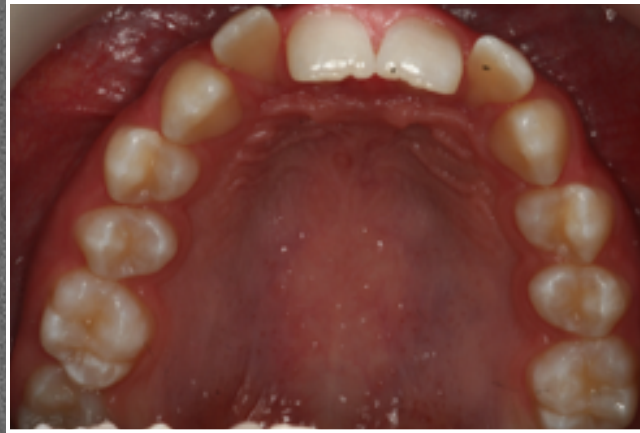
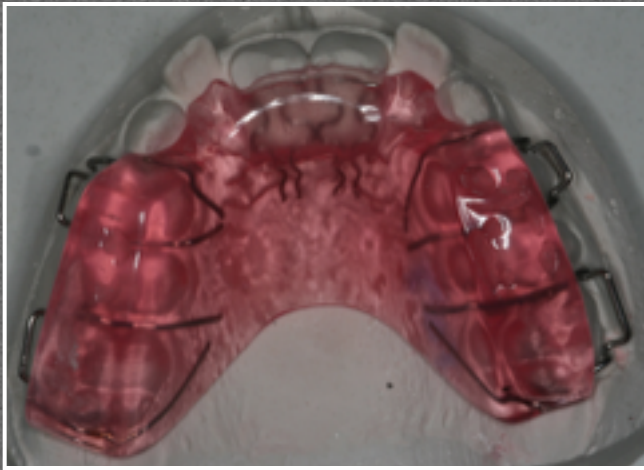
CLASS II DIVISION 2: URA



I/2 II
Buccal
Segment



CLASS II DIVISION 2: URA





FULL DECOMPENSATION?



COMPLIANCE

AUTHOR	YEAR	DISCONTINUATION RATE (%)
ILLING ET AL.	1998	16
CALDWELL & COOK	1999	49
O' BRIEN ET AL.	2003	33
BANKS ET AL.	2004	30
GILL & LEE	2005	14
LEE ET AL.	2007	10

COMPLIANCE



COMPLIANCE

- Operator: Belief, relationships
 - Patient: Age/maturity
 - Appliance: Design
 - Protocol: Prescribed wear duration
- Sitting in a 3.8-metre sea kayak and watching a four-metre great white approach you is a fairly tense experience

MOTIVATION

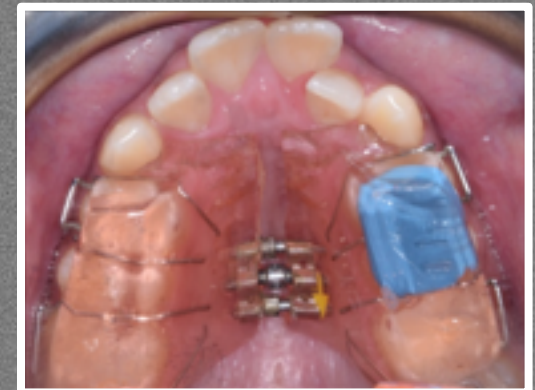
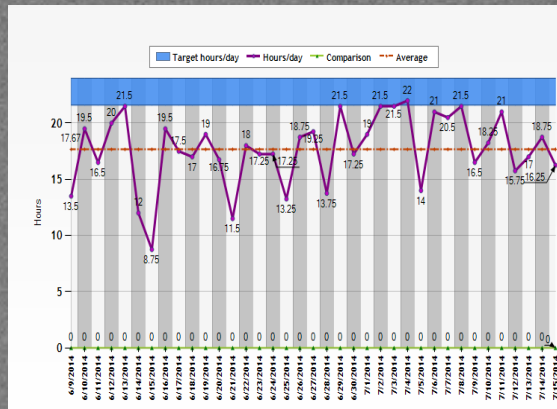
If there is a better reason to paddle, I don't know what it is.

FUNCTIONAL APPLIANCES

PART-TIME:
12 HOURS

VS.

'FULL'-TIME:
22 HOURS



FUNCTIONAL APPLIANCES



PART-TIME:
12 HOURS

VS.

'FULL'-TIME:
22 HOURS



RANDOMIZED CONTROLLED TRIAL



AJO-DO

Effectiveness of part-time vs full-time wear protocols of Twin-block appliance on dental and skeletal changes: A randomized controlled trial

Jeet Parekh,^a Kate Counihan,^a Padhraig S. Fleming,^a Nikolaos Pandis,^b and Pratik K. Sharma^a
London, United Kingdom, and Bern, Switzerland



FUNCTIONAL APPLIANCES



Treatment Changes	Part Time		Full Time		Coefficient	P Value	95% Confidence Intervals	
Variable	Mean Change	SD	Mean Change	SD				
Overjet (mm)	-7	2.92	-6.5	2.62	0.382	0.587	-1.01	1.78
Pogonion to Sella Vertical (mm)	3.25	2.81	3.35	2.7	-0.036	0.964	-1.64	1.57
A Point to Sella Vertical (mm)	1.28	1.78	1.06	2.04	0.228	0.664	-0.82	1.28
ANB (°)	-1.51	1.49	-1.25	3.05	0.083	0.828	-0.68	0.849

ANCOVA adjusted for gender, age, overbite, SNB and LAFH

NO DIFFERENCE OJ REDUCTION

NO DIFFERENCE SKELETAL CHANGE

FUNCTIONAL APPLIANCES

Part Time	Subjective (Wear Chart)		Objective (Theramom Sensor)		Difference	P Value	Confidence Intervals	
Appointment	Mean	SD	Mean	SD				
1	11.22	2.19	7.93	4.07	3.29	*0.003	1.2	5.38
2	11.97	1.16	8.33	4.07	3.64	*0.001	1.16	5.7
3	11.79	0.93	9.85	3.87	1.94	0.118	-0.53	4.41

8 HOURS IN PART-TIME GROUP



FUNCTIONAL APPLIANCES

Full Time	Subjective (Wear Chart)		Objective (Theramon Sensor)		Difference	P Value	Confidence Intervals	
Appointment	Mean	SD	Mean	SD				
1	20.03	2.98	12.16	6	7.87	0.601	-8.13	13.66
2	19.59	3.21	13.32	6.29	6.27	*0.003	2.36	10.16
3	19.27	11.01	11.02	6.42	8.25	*0.001	3.89	12.61

12 HOURS IN 'FULL'-TIME GROUP



FULL-TIME VS PART-TIME: LATERAL OPEN BITES

- Ongoing study
- 3-month withdrawal
- 12 to 15 months
- Baseline (12-month) scores lower in PT
- Remain marginally smaller at 15 months



FACTORS INFLUENCING COMPLIANCE

ORIGINAL ARTICLE

AJO-DO

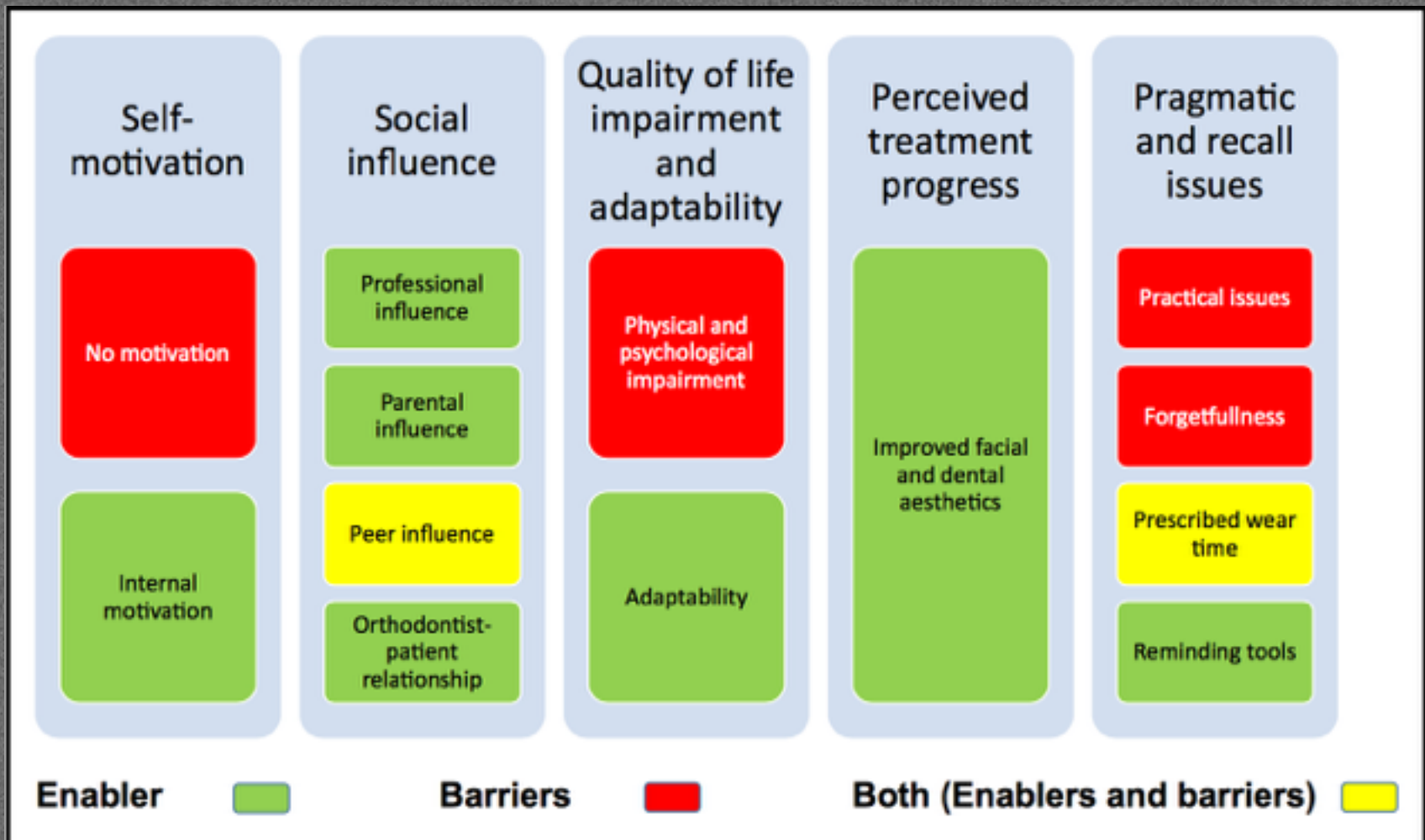
Understanding factors influencing compliance with removable functional appliances: A qualitative study

Anas El-Huni,^a Fiorella B. Colonio Salazar,^b Pratik K. Sharma,^c and Padhraig S. Fleming^c

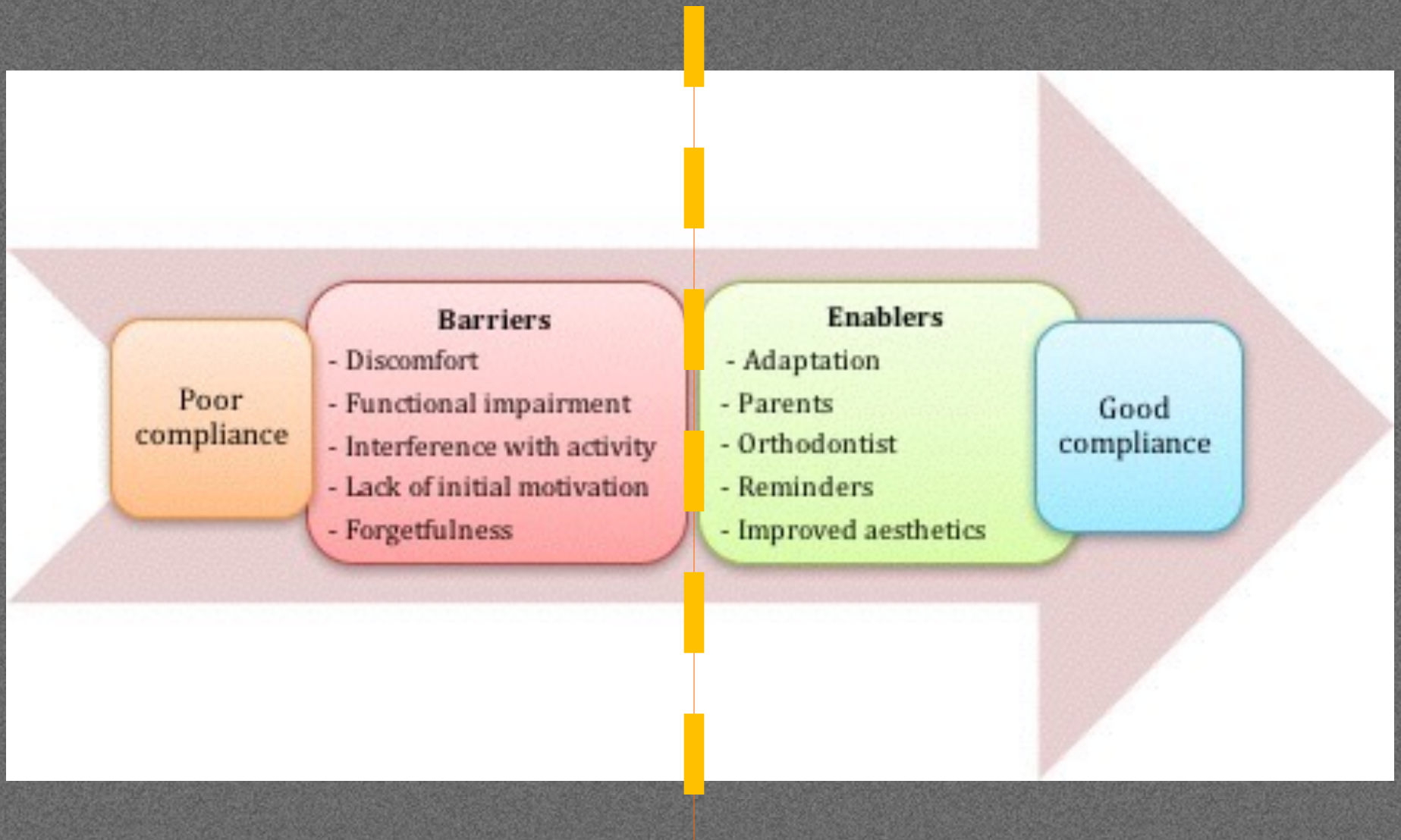
Benghazi, Libya and London, United Kingdom

Introduction: Lack of compliance during functional appliance therapy may lead to extended treatment or even induce treatment failure. The aims of this study were to explore factors influencing compliance in adolescents treated with a Twin-block appliance. **Methods:** A qualitative study using one-to-one semistructured interviews involving a sample of adolescents undergoing Twin-block therapy with objectively recorded wear durations was undertaken. A topic guide was used to standardize data collection. Participants' views were tape recorded and field notes taken. Data were transcribed verbatim and analyzed with the use of framework methodology. **Results:** A total of 22 participants were interviewed. Factors influencing compliance with removable functional appliance included: self-motivation, peer and authority influence, quality of life impairment and adaptability, perceived treatment progress, and pragmatic and recall issues. These factors were found to exert important roles as enablers, barriers, or both. Patient recommendations to improve compliance included effective communication, tailoring of prescribed wear duration, physical alteration of the appliance, and use of reminding tools. **Conclusions:** The study highlights the multifaceted perceptions of removable functional appliance wear, with compliance fluctuating over time and a range of factors influencing this. The potential for professional and parental influence as well as customized reminders to enhance compliance were also reported. (*Am J Orthod Dentofacial Orthop* 2019;155:173-81)

FACTORS INFLUENCING COMPLIANCE



COMPLIANCE



FACTORS INFLUENCING COMPLIANCE

Effective communication:

- Visual aid (e.g. pictures)
- Positive reinforcement
- Explain temporary nature of functional interference

Tailoring of prescribed wear duration:

- No specific trend

Recommendations

Characterisitcs of the appliance:

- Smaller size
- Inclusion tracking sensor

Reminding tools:

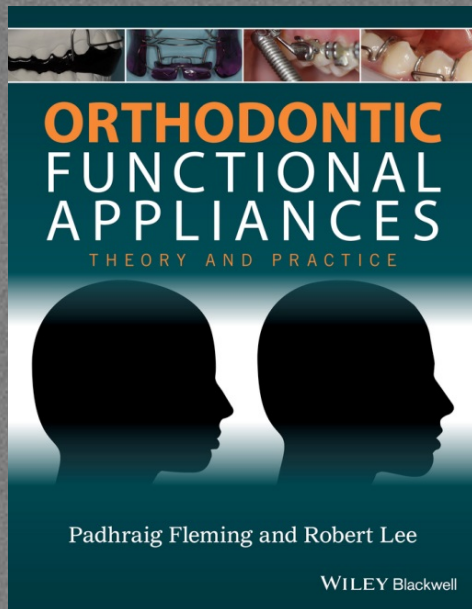
- Phone Application
- Memorable storage location



FUNCTIONAL APPLIANCES



- RESEARCH CHANGING MY PRACTICE?



- TIMING/PHASING: SCHOOL?
- APPOINTMENT SCHEDULE: AUXILIARY?
- FULL-TIME VS PART-TIME ??



COMPLIANCE: COMMUNICATION

- Personality-based: Jonathan Sandler
- 'Powerful, works well and quickly'
- Frequent recall at start



COMPLIANCE: RECALL

- Review 1-3:
 - 2 weeks (Aux.)
 - 1 month: TRANSVERSE
 - 6 weeks (Aux.)
- Review 4: 3 months
- Review 5: 6 months
- Review 6: 9 months
- Review 7: 12 months



COMPLIANCE: WEAR PRESCRIPTION

- Compliance often limited
- Part-time wear may be sufficient
- Eating
- Consider tapering introduction and have awareness of merits of nights-only wear



COMPLIANCE: DESIGN

- Design:
 - Avoid labial bow
 - Vertical opening
 - Appearance with appliance in place
 - Electronic reminders?
 - Electronic timers?



TWIN BLOCK: CONCLUSIONS

- Useful, predictable?
- Standard management protocol
- Design considerations: Maximise change and compliance
- Motivation



TWIN BLOCK: CLINICAL APPLICATIONS



PADHRAIG FLEMING



Barts and The London
School of Medicine and Dentistry

www.smd.qmul.ac.uk