

STABILITY IN RAPID MAXILLARY EXPANSION: A Systematic Review Of Randomised Controlled Trials

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INTRODUCTION:

Maxillary transverse deficiency is one of the most prevalent problems that is commonly encountered, Upto almost 23.3% in deciduous dentition group¹. As growth first gets completed in the transverse plane, it is very important to diagnose it and treat it as early as possible.

According to Harrison and Ashby(2001)² concluded that the trails before 1999 were insufficient and non-conclusive as they were only quantitative. Hence in this article, the RCT's from 2000 will be reviewed.

MATERIALS AND METHODS:

A literary search was done to identify all the RCT's on stability in rapid maxillary expansion and to identify eligible RCT's with the following inclusion criteria:

POPULATION:

Studies those included patients with posterior cross bite and without craniofacio deformities.

INTERVENTIONS:

Expansions with orthodontic/ orthopedic devices to correct posterior cross bite were included

CONTROLS:

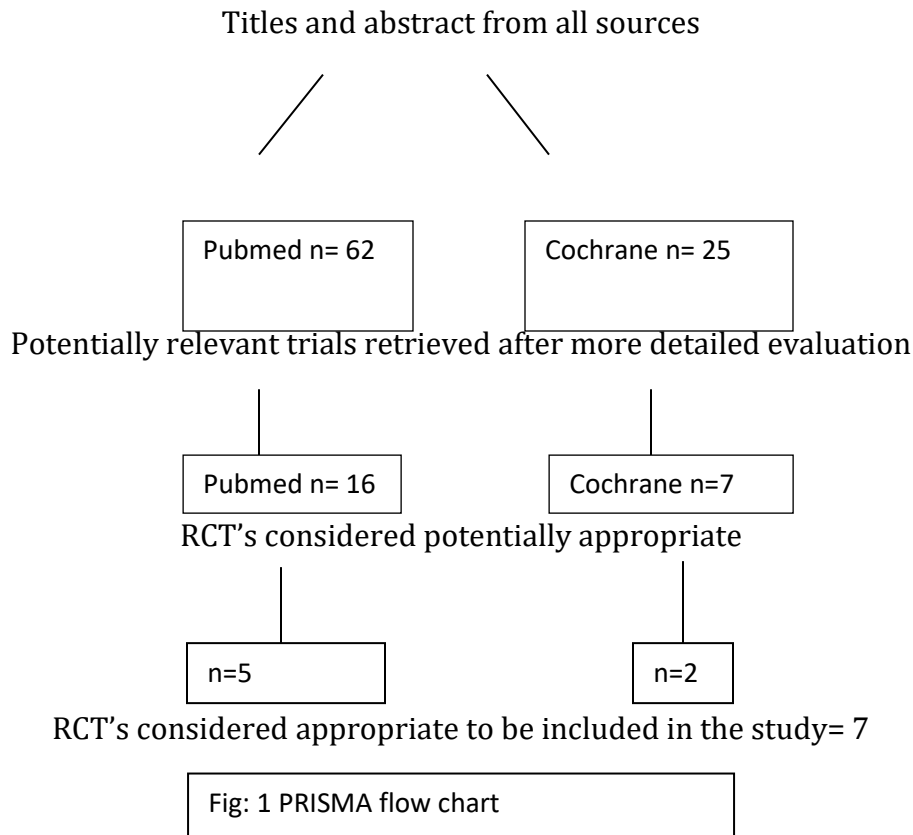
Controls were picked from the same sample but who did not receive any treatment. Those with normal occlusion were excluded

OUTCOMES:

1. Correction of posterior crossbite
2. Amount of expansion quantified both with linear as well as angular measurements
3. Stability checked by measuring expansion at end of treatment and after a minimum of 6 months post retention

STUDIES: Only Randomised controlled trials with articles that declared randomization were included. Articles from 2000 to 2019 were collected (the earlier articles were

examined in the Intervention Review: Harrison and Ashby (2001). Search of the Cochrane Central Register of Controlled Trials (CENTRAL), via the Cochrane Library using the search strategy “stability and rapid maxillary expansion” and in Pubmed as “stability and rapid palatal expansion”



The titles were assessed to select the potential RCT's that meet our inclusion criteria. From the selected articles, the abstracts were read and further filtered. The articles of those which met the inclusion criteria were finally collected as eligible articles.

RESULTS:

With the electronic and hand searches, 62 articles from pubmed and 25 articles from cochrane were retrieved, which were entered into a PRISMA flow chart (Figure 1) to illustrate the path for selecting the clinical trials (Moher et al. ,2009).

After evaluating titles and abstracts, 16 and 7 articles were obtained respectively. After evaluating the full text, we determined that 7 articles satisfied the inclusion criteria.

Methodological quality

1. The method of randomization was considered adequate for 6 of the 12 trials. In the article of Petrén et al. (2011) , most of the crossbite patients were recruited from the previous RCT sample (Petrén and Bondemark,2008) .

2. Allocation concealment was considered adequate only in one study (Petrén et al. , 2011), inadequate or unclear for the remaining articles.

3. Blinding for outcome evaluation was reported in 5 trials.

4. The reporting and analysis of dropouts were considered adequate in 4 of 12 trials. Three studies were assessed to have low risk of bias(Petrén and Bondemark, 2008 ; Godoy et al. , 2011 ; Petrén et al. , 2011).

5. One article was assessed to have moderate risk of bias (McNally et al. , 2005).

STUDY	POPULATION	INTERVENTION	CONTROLS	OUTCOME
Prado <i>et al</i> 2014	Adults with transverse maxillary deficiency greater than 7 mm	SARPE	Retention group n=15 and non retention group n=15	use of a transpalatal arch as a retaining device does not improve dento-osseous stability
Prado <i>et al</i> 2013	Adults with transverse maxillary deficiency	SARPE	Retention group n=15 and non retention group n=15	no retention other than the expander appliance is needed after SARPE
Pinheiro <i>et al</i> 2014	Growing subjects with maxillary constrictions and bilateral buccal crossbites	RME, SME, edwise therapy	RME=30 SME=30 Edgewise=30	Rapid and slow maxillary expansion showed similar stability in the long-term.
Sokucuet <i>et al</i> 2009	Bilateral posterior crossbite	RME, SARPE	RME= 14 SARPE=13	the dentoalveolar responses of RME and SARME were similar after orthodontic treatment
Lim <i>et al</i> 2017	Bilateral posterior cross bite	MARPE	MARPE =14	MARPE can be used as an effective tool for correcting maxillomandibular transverse discrepancy, showing stable outcomes 1 year after expansion
Hong <i>et al</i> 2011	Posterior cross bite	single-threaded cylindrical and tapered, double-	simulated bone with cortical and trabecular	New implant with shorter and wider dimension was more stable

		threaded cylindrical and tapered, new with shorter and wider dimensions	bone layers	
Choi et al 2016	Adults with posterior cross bite	MARPE	MARPE=69	Nonsurgical MARPE can be a clinically acceptable and stable treatment

DISCUSSIONS:

Some methodological flaws in this review are possible: only abstracts in English were considered, not all database were searched, and contacts with some authors for explanations failed. Seven trials were considered appropriate for inclusion in this review, but their protocols were too heterogeneous to proceed with a quantitative analysis.

CONCLUSIONS:

1. In adult patients with posterior cross bite, MARPE appears to be more stable
2. No separate retention device was necessary other than the RME appliance itself after expansion
3. Stable results have been measured at the 6 month follow-up after removal of the retention plate in the treated groups in the maxillary intermolar and intercanine distances.
4. Most of the studies appear to be at high risk of bias since they did not meet any of the major criteria for methodological quality. Treatment outcomes were different depending on the appliance used, but small sample size, bias and confounding variables, lack of blinding in measurements, and deficient statistical methods do not allow for any sound comparison.

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