



# EFFICACY OF ELECTRIC TOOTH BRUSHING DURING ORTHODONTIC TOOTH MOVEMENT-A SYSTEMATIC REVIEW

Dr M Jeeva Rekha<sup>1</sup>, Dr Harini R<sup>2</sup>, Dr Deepak Chandrasekharan<sup>3\*</sup>

## Abstract:

Orthodontic treatment comprises of various components like brackets , arch wires, springs, bands etc., which serves as a major cause for food accumulation. Wearing the orthodontic devices it is not easy to care for teeth and gums. Even the simplest orthodontic device is a great centre for the accumulation of food residues and dental plaque. It is difficult to clean places around the orthodontic device and self-cleaning is also disrupted. Tooth brushes can one effective device which aids in proper cleaning of teeth and gums .Lately advent of electric tooth brushes is slowly changing the cleaning pattern of teeth when compared to conventional manual tooth brushing<sup>1</sup>. This systematic review throws lights of efficacy of these electric tooth brushes during orthodontic treatment.<sup>2,3</sup>

**Key Words:** Electric tooth brush, orthodontic treatment, oral hygiene.

<sup>1\*</sup> Associate Professor, Department of Dental Surgery Government Medical College , Omandurar Government Estate, Chennai , Orchid : 0009-0009-7550-1970

<sup>2</sup>Department of Orthodontics, Former Post Graduate Student, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research., Chennai

<sup>3</sup>Professor & Head, Department of Orthodontics & Dentofacial Orthopedics, SRM Kattankulathur Dental College & Hospital, SRM Institute of Science and Technology, Chennai Orchid : 0000-0002-5375-5824

**\*Corresponding Author:** Dr. C Deepak Chandrasekharan

\*MDS, PhD, Professor & Head, Department of Orthodontics & Dentofacial Orthopedics, SRM, Kattankulathur Dental College & Hospital, SRM Institute of Science and Technology, Chennai

Email : deepakc@srmist.edu.in

**DOI:** - 10.31838/ecb/2023.12.s3.739

## INTRODUCTION:

Orthodontic patients frequently experience compromised oral hygiene during long periods of treatment. The presence of multibanded/bonded attachments further prevents patients from achieving good oral hygiene due to the nature of appliances used , and also creates an unaesthetic appearance and impaired tooth movement. Therefore, it is the important for the treating orthodontist the patient's oral hygiene and eventual periodontal status at each appointment. An oral hygiene instruction which invariably includes thorough brushing and effective use of mouthwashes has become mandatory. An electric toothbrush which was first produced by Tomlinson Moseley and was sold as the Motodent Inc on December 13, 1937 believed it to be more effective in removing plaque .

## MATERIALS AND METHODS:

A computerized systematic search was performed in 2 electronic database :PubMed and Medline.

Manual searches were done to find relevant published materials that might have been missed in electronic searches. No restriction were placed on year, publication status , of the article. The search was performed up to 14/11/2022.

## Inclusion criteria included Inclusion criteria were:

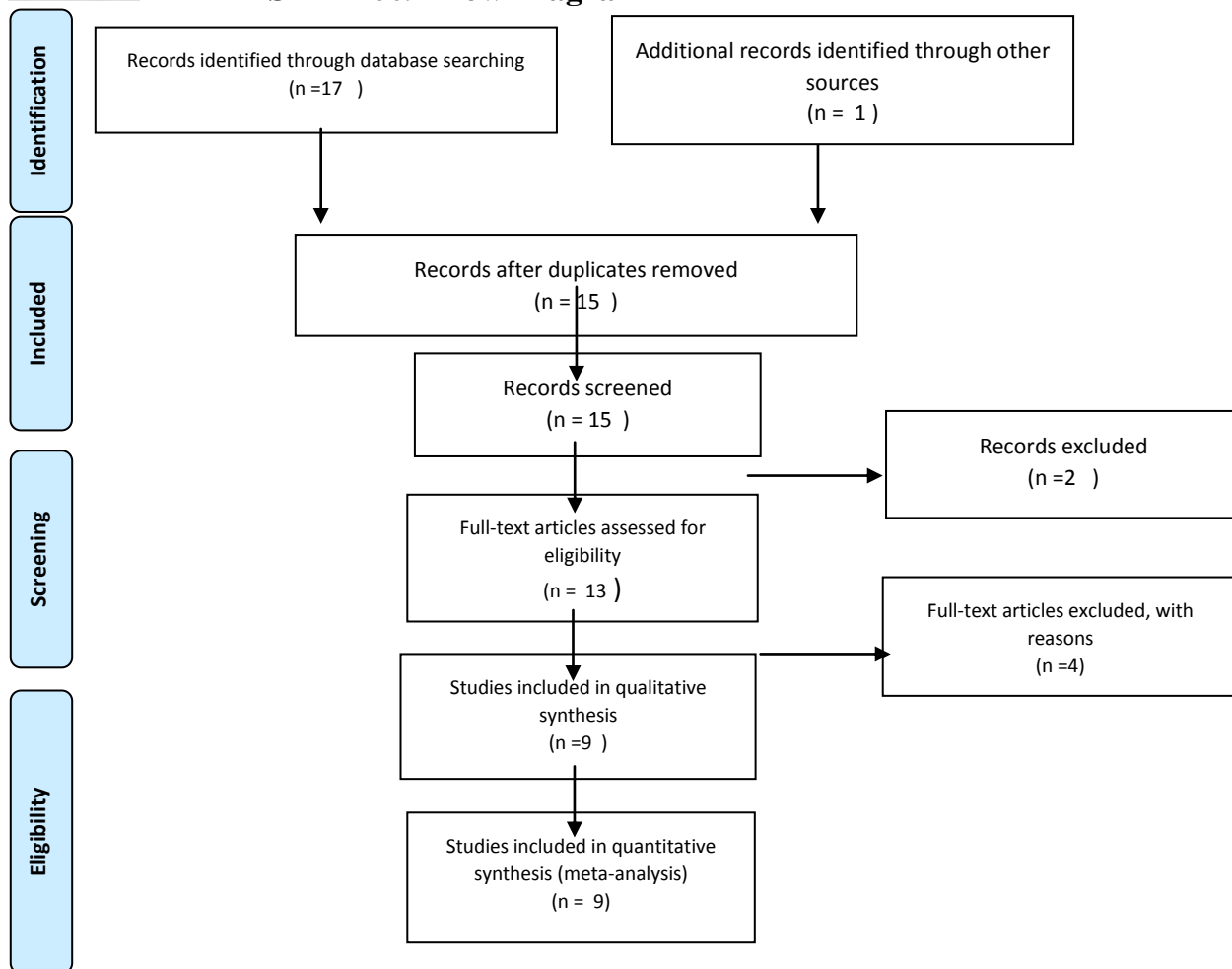
- 1) population: human patients receiving orthodontic mechanotherapy;
- 2) intervention: orthodontic tooth movement with conventional fixed appliance.
- 3) studies done as RCT and clinical trails .

## Exclusion criteria included:

- 1) Studies done after completion of orthodontic treatment
- 2) studies which included compromised periodontium
- 3) Studies which did not use manual tooth brushes in their study 4)other language study.



### PRISMA 2009 Flow Diagram



**RESULTS:**

S.No	AUTHOR	SAMPLE	INTERVENTION	COMPARISION	OUTCOME
1.	Mazzoleni et al	72 patients undergoing orthodontic treatment with fixed appliance and rapid palatal expanders.	Calculating plaque and gingival index during banding, one month later and after 3 months	Patient equipped with manual tooth brush vs patients equipped with electric tooth brush	Electrical tooth brush users has better oral hygiene.
2.	Erbe C et al	46 patients with orthodontic treatment	Digital plaque imaging	oscillating-rotating electric toothbrush with a specially designed orthodontic brush head vs the same electric toothbrush handle with a regular brush head vs regular manual toothbrush	electric toothbrush, with either brush head, demonstrated significantly greater plaque removal
3.	Silvestrini et al	20 patients aged 10 – 14 years	Plaque index and gingival bleeding index	electric vs manual tooth brush	electric oscillating-rotating toothbrush was found to better improve both PI and GBI
4.	Costa et al	21 patients with orthodontic appliance	Saliva quantification of S.mutans	Manual vs electric and ultrasonic tooth brushes	This study did not demonstrate that the ultrasonic toothbrush was better in reducing gingival inflammation in adolescent orthodontic patients, but plaque scores were lowered on buccal surfaces of teeth with orthodontic brackets. In addition, S mutans counts were markedly decreased in the electric brush users
5.	Borutaa et al	80 subjects with mean age of 15 years	QHI and SBI.	Manual vs electric tooth brush	Electric tooth brushes were proved more effective
6.	Thienpont V et al	36 patients with mean age of 15 years	Gingival index ,bleeding on probing index,plaque index-tooth and bracket	2 manual vs 2 electric tooth brushes	Found no difference in efficacy between manual and electric tooth brushes
7.	Celerihugh V et al	41 subjects who used the electric toothbrush and and 43 subjects who brushed with a manual toothbrush	Silness and Loe plaque index and gingival index and Eastman interdental bleeding index.	Manual vs electric tooth brush	Electric tooth brush was more effective.
8.	Heasman et al	60 patients aged 10 to 16 years	Visible Plaque Index, GBI, Gingival Bleeding Index	Manual vs electric	Both were effective
9	Trombeli et al	20 subjects with 10 to 26 years	Plaque index	Counterrotation electric vs manual tooth brush	Counter rotational tooth brush was more effective in removing supra gingival plaque

**DISCUSSION:**

Various authors suggest mechanical cleaning advices for providing good oral hygiene. As the apparent risks of orthodontic treatment which include (white spot lesions, gingivitis, dental caries etc) should be minimised as much as possible.<sup>4,5,6,7</sup>

Rapid palatal expander uses where divided into two categories which consisted of one equipped with a manual toothbrush (Group A), the other with an electric toothbrush (Group B). Each child's plaque index (PI) and gingival index (GI) were calculated at banded molar level at times T0 (before banding), T1 (a month later), T2 (3 months later) and T3 (when the expander was removed). At each appointment, the PI and GI were recorded and the patient was remotivated to follow ideal brushing. This study statistically proved that electric tooth brushes are more effective and easier to use during orthodontic treatment.

In a study which was replicate-use, single-brushing, 3-treatment, examiner-blind, randomized, 6-period crossover study with

washout periods of approximately 24 hours between visits statistically proved the efficacy of electric tooth brushing.<sup>2</sup>

Though various studies gave various inferences, lot of compliance was expected from the patients.<sup>8,9,10,11,12</sup> The method of brushing was not assured, duration of brushing, there was also a variation in the brands of tooth brushes used. A longer trial could be considered to further substantiate the efficacy of the brushes not only on plaque removal, but also on their effects on gingival health of orthodontic patients.

**CONCLUSION:**

The regular and effective removal of plaque from all surfaces of teeth, both above and below the gingival margin, is essential for the prevention of gingival and periodontal disease. Effective removal of plaque is compromised significantly when fixed orthodontic appliances are worn and the accumulation of plaque, and the development of gingivitis and gingival overgrowth are well-recognized problems. Orthodontists should enhance the patients dental awareness and oral

hygiene along with proper professional prophylaxis and fluoride applications irrespective of what tooth brush is used . Our systematic study have shown that electric toothbrushes are effective in management of plaque in orthodontic patients when used properly .

**SOURCE OF FUNDING:** Nil

**CONFLICTS OF INTEREST:**

We herewith state that the enclosed article is free of conflicts of interest.

**EFFICACY OF ELECTRIC TOOTH BRUSHING DURING ORTHODONTIC TOOTH MOVEMENT-A SYSTEMATIC REVIEW**

**REFERENCES:**

1. "Electric toothbrush ". Google Patents , 13 December 1937. Retrieved 25 september 2020 .
2. R. Rebekah, R . Navaneethan , Cleaning efficacy of regular , orthodontic and electric toothbrushes around brackets – an invitro study ,Journal of of Clinical and Diagnostic Research , 2023 , May , Vol -17(50)
3. C Deepak , B Saravanan , SK Kumar , CBCT-A Paradigm shift in the management of dental impactions , Indian journal of Multidisciplinary Dentistry 1 (2) , 2011 .
4. Mazzoleni S, Bonaldo G, Pontarolo E, Zuccon A, De Francesco M, Stellini E. Experimental assessment of oral hygiene achieved by children wearing rapid palatal expanders, comparing manual and electric toothbrushes. *International journal of dental hygiene*. 2014 Aug;12(3):187-92.
5. Erbe C, Klukowska M, Tsaknaki I, Timm H, Grender J, Wehrbein H. Efficacy of 3 toothbrush treatments on plaque removal in orthodontic patients assessed with digital plaque imaging: a randomized controlled trial. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2013 Jun 1;143(6):760-6.
6. Biavati AS, Gastaldo L, Dessı M, Biavati FS, Migliorati M. Manual orthodontic vs. oscillating-rotating electric toothbrush in orthodontic patients: a randomised clinical trial. *European Journal of Paediatric Dentistry*. 2010;11(1):200-2.
7. Costa MR, Silva VC, Miqui MN, Sakima T, Spolidorio DM, Cirelli JA. Efficacy of ultrasonic, electric and manual toothbrushes in patients with fixed orthodontic appliances. *The Angle Orthodontist*. 2007 Mar;77 (2):361-6.
8. Borutta A, Pala E, Fischer T. Effectiveness of a powered toothbrush compared with a manual toothbrush for orthodontic patients with fixed appliances. *The Journal of clinical dentistry*. 2002;13(4):131-7.
9. Thienpont V, Dermaut LR, Van Maele G. Comparative study of 2 electric and 2 manual toothbrushes in patients with fixed orthodontic appliances. *American journal of orthodontics and dentofacial orthopedics*. 2001 Oct 1;120(4):353-60.
10. Clerehugh V, Williams P, Shaw WC, Worthington HV, Warren P. A practice-based randomised controlled trial of the efficacy of an electric and a manual toothbrush on gingival health in patients with fixed orthodontic appliances. *Journal of dentistry*. 1998 Nov 1;26(8):633-9.
11. Heasman P, Wilson Z, Macgregor I, Kelly P. Comparative study of electric and manual toothbrushes in patients with fixed orthodontic appliances. *American journal of orthodontics and dentofacial orthopedics*. 1998 Jul 1;114(1):45-9.
12. Trombelli L, Scabbia A, Griselli A, Zangari F, Calura G. Clinical evaluation of plaque removal by counterrotational electric toothbrush in orthodontic patients. *Quintessence International*. 1995 Mar 1; 26 (3).