

KEMAMPUAN *TRIPLE JUNCTION TELESCOPIC TUBE SPACE MAINTAINER* (*TJTT SM*) DALAM MENJAGA RUANG AKIBAT PENCABUTAN GIGI RAHANG ATAS PADA USIA ANAK

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INTISARI

Latar Belakang. Karies gigi menyebabkan gigi desidui tanggal sebelum waktunya (*premature loss*), jika tidak dirawat akan berisiko terjadi penutupan ruang dan kegagalan fungsi mastikasi serta terjadinya kelainan oklusi pada anak. Alat yang digunakan untuk perawatan preventif ortodonti ini adalah *space maintainer*, yang berfungsi menjaga ruang dan membantu pengunyahan. Alat model lama, yang ada selama ini *rigid* dan harus diganti per 1-2 bulan karena kesempitan, sehingga perlu dikembangkan inovasi baru yang mengikuti pertumbuhan rahang ke arah *lateral* dan *anteroposterior*.

Tujuan. Tujuan penelitian ini adalah mengembangkan dan meninjau *SM* Tipe I dengan metode *in silico*; serta membuktikan hasil uji *klinis TJTT SM* ditinjau dari jarak *Inter canine*, jarak *intermolar*, jarak *anteroposterior* dan tingkat kenyamanannya

Metode. Penelitian tahap pertama merupakan eksperimental laboratoris. Pengambilan sampel secara *simple random sampling*, melibatkan 30 *SM* Tipe I dan 30 *TJTT SM*, di Laboratorium Sensor dan Sistem Tele Kontrol, Departemen Teknik Nuklir dan Teknik Fisika, Fakultas Teknik, Universitas Gadjah Mada. Penelitian tahap kedua berupa penelitian *klinis*, disain penelitian *randomized controlled trial*. Subjek pasien anak usia 6-14 tahun. Pengambilan sampel secara *consecutive (non probability sampling)*, melibatkan 30 *SM* Tipe I dan 30 *TJTT SM*, di Rumah Sakit Gigi Mulut, Universitas Muhammadiyah Yogyakarta.

Hasil Penelitian. Hasil penelitian *in silico* menunjukkan pengembangan desain *TJTT SM* berupa sudut *fulcrum* 120⁰, titik *fulcrum* di tengah alat, ketebalan akrilik 2 mm, letak *anchorage* seimbang kanan dan kiri, serta letak *clamer* pada gigi posterior. Hasil penelitian *klinis* menunjukkan bahwa perawatan dengan menggunakan *TJTT SM* menghasilkan : jarak *inter canine* lebih besar 0,11 mm dan *intermolar* lebih besar 0,22 mm dibandingkan *SM* Tipe I, jarak *anteroposterior* lebih besar 1,99 mm dibandingkan *SM* Tipe I, penggunaan *TJTT SM* lebih nyaman dibandingkan *SM* Tipe I, dengan selisih *gradien score* 0,9.

Kesimpulan. Kesimpulan penelitian ini adalah *triple junction telescopic tube space maintainer (TJTT SM)* adalah *TJTT SM* secara *in silico* merupakan pengembangan *SM* Tipe I untuk menjaga ketersediaan *space* rahang atas pada usia anak, dengan parameter : letak titik *fulcrum* terbaik di tengah/pusat alat, terjadi keseimbangan gaya (F) adalah $F_{lateral 1} = F_{lateral 2}$ dan $F_{anteroposterior} = F_3$, letak *anchorage* terbaik pada keseimbangan kanan dan kiri, letak *clasp* terbaik pada gigi posterior, keseimbangan terjadi ke arah *lateral* kanan dan kiri pelat bersudut sama 120⁰. *TJTT SM* secara *in silico* lebih baik dibandingkan *SM* Tipe I. Perawatan dengan menggunakan *TJTT SM* menghasilkan jarak *inter canine* lebih besar dan jarak *intermolar* lebih besar dibandingkan *SM* Tipe I. *TJTT SM* secara klinis lebih baik dibandingkan *SM* Tipe I. Perawatan dengan menggunakan *TJTT SM* menghasilkan jarak *anteroposterior* lebih besar dibandingkan *SM* Tipe I. Perawatan dengan menggunakan *TJTT SM* lebih nyaman dibandingkan *SM* Tipe I. *Novelty* penelitian ini adalah terdapatnya tiga buah *tube* dan belahan pada alat *SM* sehingga dinamakan *TJTT SM*, sehingga dapat mengikuti pertumbuhan rahang ke lateral dan *anteroposterior* serta memberi rasa nyaman pada pasien anak.

Kata kunci: *premature loss, space maintainer, triple junction telescopic tube*

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***THE ABILITY OF TRIPLE JUNCTION TELESCOPIC TUBE SPACE
MAINTAINER (TJTT SM) IN MAINTAINING SPACE DUE TO TEETH
EXTRACTION OF THE MAXILLA IN CHILD AGE***

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ABSTRACT

Background. Dental caries may lead premature loss in deciduous teeth leading space closure and failure of mastication and occlusion abnormalities in children. The device used for preventive orthodontic is a space maintainer, which have functions to maintain space and support mastication. The conventional device, which have been rigid so far, have to be replaced every 1-2 months due to the narrowness. New innovations design of device that follow the growths of the jaw laterally and anteroposteriorly is required.

Aim. The purpose of this study is to determine the results of the TJTT SM, which is the development of the Type I SM design, *in silico* test, and determine the results of the TJTT SM in clinical trial in these measurement of intercanine distance, intermolar distance, anteroposterior distance and comfort level.

Method. The first phase of study was an experimental laboratory. The sampling method was simple random sampling, involving 30 Type I SM and 30 TJTT SM, in the Sensor and Tele Control System Laboratory, Department of Nuclear Engineering and Physics Engineering, Faculty of Engineering, Gadjah Mada University. The second phase of the study was clinical research, randomized controlled trial study design. The subjects of the study were pediatric patients aged 6-14 years. The following samples were consecutive sampling (non-probability sampling), involving 30 Type I SM and 30 TJTT SM, at the Dental Hospital, Universitas Muhammadiyah Yogyakarta.

Research result. The results of the *in silico* study showed the development of the TJTT SM design in the form of a 120° fulcrum angle, fulcrum point in the center of the instrument, 2 mm acrylic thickness, right and left balanced anchorage location, and the position of the clasp in posterior teeth. The results of the clinical study showed that treatment using TJTT SM resulted in: greater intercanine distance 0.11 mm and 0.22 mm greater intermolar distance than Type I SM, the anteroposterior distance was 1.50 mm greater than Type I SM, the use of TJTT SM was more comfortable compared to SM Type I, with a score gradient difference of 0.9.

Conclusion. The conclusion of this study is that the triple junction telescopic tube space maintainer (TJTT SM) is an *in silico* TJTT SM which is the development of Type I SM to maintain the availability of maxillary space at a child's age, with parameters: the location of the best fulcrum point in the center / center of the tool, balance occurs The force (F) is Flateral 1 = Flateral 2 and Fanteroposterior = F3, the best anchorage is on the right and left balance, the best clasp is on the posterior teeth, the balance is lateral to the right and left of the plate with the same angle of 120°. TJTT SM *in silico* is more better than Type I SM. Treatment using SM TJTT resulted in greater intercanine distance and greater intermolar distance than Type I SM. SM TJTT was clinically better than Type I SM. Treatment using SM TJTT resulted in greater anteroposterior distance than Type I SM. I. Treatment using TJTT SM is more comfortable than Type I SM. The novelty of this study is the presence of three tubes and a cleavage on the SM appliance so it is called TJTT SM, so that it can follow the growth of the jaw laterally and anteroposteriorly and provide a sense of comfort for pediatric patients.

Keywords: premature loss, space maintainer, triple junction telescopic tube

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