

**THE STABILITY OF THE CURVE OF SPEE
AND THE OVERBITE
AFTER ORTHODONTIC TREATMENT**



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by

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Study leader: Professor S.T. Zietsman

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“Never regard study as a duty, but as the enviable opportunity to learn to know the liberating influence of beauty in the realm of the spirit for your own personal joy and to the profit of the community to which your later work belongs”

- Albert Einstein -

DEDICATION

**This dissertation is dedicated to my wife, Marina,
and my two children, Johné and Ruan.**

Thank you for understanding.

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All the patients that took part in the study, for attending the follow-up appointment, and for giving consent that their records can be used for research purposes.

DECLARATION

I, Johannes Hattingh, declare that the dissertation I am herewith submitting for the degree MChD (Orthodontics) at the University of Pretoria, is my own work and has not previously been submitted for any other degree at any other university.

J. Hattingh

5 May 2003

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SUMMARY

THE STABILITY OF THE CURVE OF SPEE AND THE OVERBITE AFTER ORTHODONTIC TREATMENT

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The aim of orthodontic treatment is to provide the patient with a good static and functional occlusion. During research that was conducted to complete a seminar on the static and functional aspects of occlusion, the author discovered that there might be a discrepancy between the goals of an ideal static occlusion, and the goals of an ideal functional occlusion. An ideal static occlusion seemed to require a flat mandibular plane and a minimal amount of overbite after active orthodontic treatment, whereas an ideal functional

occlusion required a curved mandibular plane and an overbite of 4 mm to prevent cusp interferences during functional mandibular movements.

The rationale behind the excessively flat mandibular plane and minimal overbite after orthodontic treatment is to compensate for the tendency of the bite to deepen during the period following orthodontic treatment. This tendency to relapse causes uncertainty about the stability of orthodontic treatment. Little research has been dedicated to examining the long-term stability of the leveled curve of Spee. In addition, there seems to be a considerable amount of controversy surrounding the long-term stability of overbite correction after orthodontic treatment.

The aim of this study was to evaluate the stability of the curve of Spee and the overbite following orthodontic treatment. In addition, the relationship between the curve of Spee and the presence of anterior guidance after a period of orthodontic retention, was examined. The relationship between the overbite and the presence of anterior guidance was also examined, and the results were used to predict an ideal value for the overbite to avoid possible dental cusp interferences.

Standardized digital photographs of the dental casts of 40 subjects were taken at three different stages: before treatment (T1), after orthodontic treatment (T2), and three years (mean) post-treatment. Accurate electronic measurement of the curve of Spee, using computer software, was completed for all three stages. The overbite was measured with a dial caliper. Clinical evaluation of the functional occlusion, with special reference to anterior guidance, was performed on all the subjects. Statistical analysis was carried out in search of statistical significant changes between the various stages, and possible correlations between the different variables.

The results indicated that the leveling of the curve of Spee is a stable treatment procedure. The overbite was less stable than the curve of Spee,

and nearly half the amount of overbite correction obtained during treatment, relapsed in the three years (mean) post-treatment. No relationship was found between the curve of Spee and the presence of anterior guidance at T3. A highly significant relationship was found between the overbite and the presence of anterior guidance. Subjects with a small overbite seemed to be predisposed to posterior interferences during mandibular protrusion.

An overbite of not less than 3mm was found to be a desirable feature after orthodontic retention in order to reduce potentially interfering contacts. More research is necessary to clarify the relationship between dental interferences and temporomandibular disorders (TMD).

OPSOMMING

DIE STABILITEIT VAN DIE KURWE VAN SPEE EN DIE OORBYT NA ORTODONTIESE BEHANDELING

deur

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Die doel van ortodontiese behandeling is om die pasiënt van 'n goeie statiese en funksionele okklusie te voorsien. Gedurende navorsing wat gedoen is om 'n seminar oor die statiese en funksionele aspekte van okklusie te voltooi, het die skrywer ontdek dat daar moontlik 'n teenstrydigheid bestaan tussen die doelwitte van 'n ideale statiese okklusie, en die doelwitte van 'n ideale funksionele okklusie. 'n Ideale statiese okklusie vereis 'n plat mandibulêre vlak en 'n minimum oorbyt, terwyl 'n ideale funksionele okklusie 'n gekurfde

mandibulêre vlak en 'n oorbyt van 4mm vereis om kuspe struikelings tydens funksionele mandibulêre bewegings te voorkom.

Die rasionaal agter die plat mandibulêre vlak en minimale oorbyt na aktiewe ortodontiese behandeling is om te kompenseer vir die neiging van die byt om te verdiep gedurende die periode na ortodonsie behandeling. Hierdie neiging tot terugval veroorsaak onsekerheid oor die stabiliteit van ortodonsie behandeling. Min navorsing is tot dusver gedoen aangaande die langtermyn stabiliteit van die kurwe van Spee. Boonop bestaan daar baie kontroversie oor die langtermyn stabiliteit van oorbyt korreksie na ortodontiese behandeling.

Die doel van hierdie studie was om die stabiliteit van die kurwe van Spee en die oorbyt na ortodontiese behandeling te evalueer. Die verband tussen die kurwe van Spee en die teenwoordigheid van 'n anterior gidshelling na 'n periode van ortodontiese retensie is ook ondersoek. Die verband tussen die oorbyt en die teenwoordigheid van 'n anterior gidshelling is ondersoek, en die resultate is gebruik om 'n ideale waarde vir die oorbyt, waarby kuspe struikelinge moontlik verhoed sal kan word, te voorspel.

Gestandaardiseerde digitale fotos is geneem van die studie modelle van 40 pasiënte gedurende drie verskillende stadia: voor behandeling (T1), direk na ortodontiese behandeling (T2), en drie jaar (gemiddeld) na behandeling. Akkurate elektroniese meting van die kurwe van Spee is met behulp van rekenaar sagteware vir al drie stadia van ondersoek gedoen. Die oorbyt is met behulp van 'n meetpasser bepaal. Kliniese evaluasie van die funksionele okklusie, met spesifieke verwysing na anterior gidshelling, is gedoen op al die pasiënte. Statistiese analise is uitgevoer op soek na moontlike statisties betekenisvolle veranderinge tussen die onderskeie stadia, asook om potensiële korrelasies tussen die veranderlikes te identifiseer.

Die resultate bevestig dat die afplating van die kurwe van Spee 'n stabiele behandelings prosedure is. Die oorbyt was minder stabiel as die kurwe van Spee, en byna die helfde van die oorbyt korreksie wat tydens behandeling verkry is, het teruggeval gedurende die drie jaar (gemiddeld) na behandeling. Geen verwantskap kon gevind word tussen die kurwe van Spee en die teenwoordigheid van 'n anterior gidshelling tydens T3 nie. 'n Hoogs betekenisvolle verwantskap tussen die oorbyt en die teenwoordigheid van 'n anterior gidshelling is gevind. Dit blyk dat 'n klein oorbyt aanleiding kan gee tot posterior struikelinge tydens mandibulêre protrusie.

'n Oorbyt van nie minder nie as 3mm is geïdentifiseer as 'n behandelingsdoelwit om die kans op kuspe struikeling na ortodontiese behandeling te verminder. Meer navorsing moet nog gedoen word om die verwantskap tussen kuspe struikelinge en temperomandibulêre patologie te verifieer.

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