

The Nite-Guide orthodontic appliance and preventive technique for the 5 to 7 year old including a review of recent research

Dr. Earl O. Bergersen

Nite-Guide(NG) is a comfortable, soft plastic appliance that can straighten a 5 to 7 year old child's permanent front teeth as they erupt into the mouth by using natural dental eruptive forces¹.

Ninety-three percent of 4 to 6 year-olds are candidates for this preventive orthodontic procedure.^{2,3} The appliance can eliminate buck teeth (overjet) of any severity, crowding up to 7mm in the deciduous dentition as the permanent incisors erupt (equivalent to 4mm of permanent crowding), overbite (where the upper front teeth cover part or all of the lower front teeth when the child closes his/her jaws), and open-bite (stops thumb-sucking – 20%). This can be achieved by wearing the NG only while sleeping.

About 4 out of every 5 children will experience one or more dental problems, such as crowding, rotated teeth, overjet and overbite as the adult teeth begin to come into the mouth. By using the natural forces of eruption, the NG appliance can guide adult front teeth into their proper positions and eliminate crowding, rotations, overjet, overbites and open-bites. Once the child's adult teeth have been guided into their proper positions by the appliance and have fully erupted, adult periodontal fibers form around the roots and lock the permanent teeth into the correct occlusion. This prevents these new teeth from relapsing. Also, relapse is frequently avoided because sufficient facial and jaw growth is present when the NG procedure is started at this early age, which helps to insure that the correction will remain stable in the future. Postponing treatment until a later age (11 to 14 years), when most of the adult teeth have fully erupted and the fibers have locked in the malocclusion, results in about 75% relapse according to research. At this later age, there is also less growth left for the child, which is necessary to stabilize most orthodontic corrections, particularly overbite and overjet.

During the first years of school, those children that appear to be "different" because of some aspect of their physical appearance may become a target for teasing or other abuse, which can decrease their developing self-confidence. The NG preventive treatment can help to give the child a normal dental appearance and improve his or her profile, smile, and self-confidence. The NG technique usually involves 2 appliances. The first, the "C" series comes in 11 prefabricated sizes, shown in Fig. 1. The second appliance, used after about 5 months is called the "G" series (Fig. 2) and comes in 13 prefabricated sizes. Both appliances are used only passively while sleeping. The appliance sizes are measured with a small measuring guide.

Measurement – The most usual measurement is from the mesial of the upper left deciduous canine to the mesial of the canine on the other side (Fig 3 a,b,c). If the upper arch is difficult to measure accurately due to flared incisors, or missing or unerupted teeth, then the lower arch from canine to canine can be used with the other side of the ruler (Fig 4a,b). A slightly larger NG is used, than is actually measured, and is usually ½ to 1 full size larger when additional space is required for the permanent lower central incisors to erupt straight. This first appliance is usually a "C" series Nite-Guide. When the lower laterals erupt through tissue, a second appliance is then used. It is usually a "G" series and most often at least two full sizes larger than the

first appliance, and is the last one used. It serves also as the retainer until about 12 years of age when the patient is dismissed. Only nighttime passive wear is necessary. The reason for this is to take advantage of the normal and expected developing arch circumference increase as the central and lateral incisors approach the tissue and enter the arch, which typically increases 3.5mm when the teeth erupt straight. It is extremely important to anticipate this increase as these teeth erupt, so as to maximize the increase rather than restrict it, especially when crowding is anticipated. Very rarely are the permanent incisors smaller than the available space between the deciduous canines, but when this does occur, it is important to recognize it so that the NG procedure can be reversed. This would be done by beginning with a NG that is smaller than the existing space so as to close the excess interproximal spaces.

A typical case is shown (Fig. 5, 6, 7) with an initial deciduous overbite of 4.25mm (Fig 5a), which is destined to increase by 2mm as the adult incisors erupt to become a 6.25mm permanent overbite. The first appliance used was a Nite-Guide "C" series #3C (while a measurement from the mesial of the left canine to the other side indicated a #2). The #3 will increase the incisal arch by 1.6mm. The appliance stayed in all night while sleeping after 5 months. The patient only wore the appliances while sleeping throughout the treatment and retention period. The appliance was increased to a "3.5 G" as the lower adult laterals began to erupt. Figures 5b, 6b and 7b indicate the progress after the Occlus-o-Guide (3.5 G) had been worn after the lower permanent laterals broke tissue. Figure 5c, 6c and 7c show the patient in retention after 10 months. Note the overbite and facial profile improvements. The overbite improved 3.75mm and the overjet improved 3.5mm. The ideal final result in a female (prior to the start of puberty) should be 1.5mm of overbite and overjet, which this patient has achieved. A male should end with a 2mm overbite and overjet. This insures that future pubertal growth will not become a problem.

The very slightly crowded lower deciduous incisal segment (fig 6a) indicated an 80-100% chance of developing lower adult incisal crowding. After about 5 months from the start, a "G" series appliance replaces the initial appliance and is typically 3 half sizes larger in anticipated crowded cases. This is usually the final appliance used. It is worn each night until the upper laterals are fully erupted for 6 months. It is then used one night per week until the adult canines and premolars break tissue. The appliance should then be worn every night until the permanent second molars are fully erupted. The patient is then dismissed. The patient is seen about every 2 months for the first 2 to 3 appointments and then at 4 to 6 month intervals until the upper laterals are in place for 6 months. The patient is then seen every 6 months until dismissal. Total chair time is about 3 hours and the average fee is about 1/3 to 1/2 of a total fixed orthodontic 2-year fee. A summary review of recently published research on this technique by Keski-Nisula et al follow^{3,4}. As well as some unpublished research by the author.

Fig. 1 Nite-Guide "C" appliance



Fig. 2 Occlus-o-Guide "G" appliance



References

1 Bergersen, E.O., Preventive Eruption Guidance in the 5-to-7 Year-Old, *J. Clin. Orthod.*, 29: 362-395, 1995.

2 Methenitou S., Shein B., Ramanathan G., Bergersen E.O., the prevention of overbite and overjet development in the 3 to 8 year-old by controlled nighttime guidance of incisal eruption: a study of 43 individuals, *J. Pedod.*, 14:218-230, 1990.

3 Keski-Nisula K., Lehto R., Lusa V., Keski-Nisula L., Varrela J., Occurrence of malocclusion and need of orthodontic treatment in early mixed dentition, *Am. J Orthod & Dentof Orthop.* 124:631-638, 2003.

4 Katri Keski-Nisula, Riitta Hernesniemi, Maritta Heiskanen, Leo Keski-Nisula and Juha Varrela, Orthodontic intervention in the early mixed dentition: A prospective, controlled study on the effects of the Eruption Guidance Appliance, *Am J. Orthod. & Dentof. Orthop.*, 133: 254-260, 2008.

5 Katri Keski-Nisula, Leo Keski-Nisula, Hannu Salo, Kati Volpio, Juha Varrela, Dentofacial changes after orthodontic intervention with Eruption Guidance Appliance in the early mixed dentition, *Angle Orthod.* 78: 324-331, 2008

Fig. 3



A) Measuring Upper From Mesial of Left Deciduous Canine Measured)



B) To Mesial of Right Deciduous Canine (3C Measured)



C) A 4C is Placed Increasing Arch by 3mm

Fig. 4



A) Measuring lower in the same way



B) Measuring lower in the same way

Fig. 5



A) Initial (4 y 10 m) Nite-Guide "C" Series Used



B) Progress (7 y 8 m) Occlus-o-Guide "G" Series Used



C) After (9 y 3 m) Occlus-o-Guide "G" Series Used as a Retainer

Fig. 6



A) Initial (4 y 10 m) Nite-Guide "C" Series Used



B) Progress (7 y 6 m) Occlus-o-Guide "G" Series Used



C) After (9 y 8 m) Occlus-o-Guide "G" Series Used as a Retainer

Fig. 7



A) Initial (4 y 10 m) Nite-Guide "C" Series Used



B) Progress (7 y 6 m) Occlus-o-Guide "G" Series Used



C) After (9 y 8 m) Occlus-o-Guide "G" Series Used as a Retainer

1) A Summary of "Orthodontic Intervention in the Early Mixed Dentition: A Prospective, Controlled Study on the Effects of the Eruption Guidance Appliance". Keski-Nisula, K., Hernesniemi, R., Heiskanen, M., Keski-Nusula, L., & Varrela, J. Am. J. Orthod. & Dentof. Orthop., 133; 254-260, 2008. (A study of the Nite-Guide technique from 5 to 8½ years of age)

Sample size: Treatment Sample = 167 (85 males, 82 females)
Control sample = 104 (52 males, 52 females)

No statistical differences between groups at 5.1 years of age. No fees to patients
Appliances worn only passively while sleeping. 69% Wore appliances to completion
Appointments: every 3 months at 5 to 10 min. each; every 6 months during retention.
Results: (all results at 8.4 yrs. significant P < .001).

| | | 5.1 yrs | 8.4 yrs |
|---|-----------|---------|---------|
| Maxillary crowding incidence | treatment | 11% | 2% |
| | control | 9% | 32% |
| Mandibular Crowding incidence | treatment | 48% | 1% |
| | control | 44% | 47% |
| Open-Bite incidence | treatment | 51% | 1% |
| | control | 30% | 36% |
| Overbite | treatment | 3.2mm | 2.1mm |
| | control | 3.3mm | 4.1mm |
| Overjet | treatment | 3.1mm | 1.9mm |
| | control | 2.9mm | 4.1mm |
| Class II Canine Relation | treatment | 1.6mm | 0.2mm |
| | control | 1.4mm | 1.4mm |
| Class II Terminal Plane Relation | treatment | 0.7mm | -1.3mm |
| | control | 0.5mm | 0.4mm |
| Need for Treatment based on overbite & openbite | treatment | | 2% |
| | control | | 74% |
| Need for Treatment mandibular crowding | treatment | | 1% |
| | control | | 47% |
| Need for Treatment maxillary crowding | treatment | | 2% |
| | control | | 32% |
| Need for Treatment overjet > 5mm | treatment | | 0% |
| | control | | 30% |
| Need for Treatment Overbite > 5mm | treatment | | 1% |
| | control | | 38% |
| Need for Treatment of Class II | treatment | | 10% |
| | control | | 52% |

Of Interest: Crowding, open bite, overbite, and overjet increased 5.1 to 8.4 yrs in control sample and decreased in the treatment group. (P<.001 at 8.4 yrs.)

Conclusions: The Nite-Guide technique is an effective treatment modality for CL II tendency, overjet, overbite, open bite, crowding, anterior and posterior crossbite. Little treatment need was required at middle mixed dentition stage when compared to the control group. 13% had mild deviations at the end of the procedure – none needed further treatment.

2) A Summary of "Dentofacial Changes after Orthodontic Intervention with Eruption Guidance Appliance in the Early Mixed Dentition"; Keski-Nisula, K. Keski-Nisula, L., Salo, H., Volpio, K. & Varrela, J., Angle Orthodontist, 78: 324-331, 2008. A study of the Nite-Guide technique from 5 to 8½ years of age. Mean treatment time 3.3 years.

Sample size: Treatment sample = 115 (62 males, 53 females)
Control sample = 104 (52 males, 52 females)

(No statistical differences between groups at 5.1 years of age).
Appliances worn only passively while sleeping. 69% wore appliances to completion.
No charges made to patients for treatment.
Appointments: every 3 months at 5 to 10 min. each; every 6 months during retention.

All results at 8.4 yrs.significant P < .001: unless indicated by N.S.= not significant.

| | | 5.1 yrs | 8.4 yrs | change | |
|---|-----------|---------|---------|--------|--------|
| Mandibular length (condylion-gnathion mm) | treatment | 96.9 | 108.0 | +11.1 | +54.2% |
| | control | 98.2 | 105.4 | + 7.2 | |
| Overbite (mm) | treatment | 3.2 | 2.0 | - 1.2 | |
| | control | 3.3 | 4.1 | + 0.8 | |
| Overjet (mm) | treatment | 3.0 | 1.9 | - 1.1 | |
| | control | 2.9 | 4.1 | + 1.2 | |
| Wits Analysis (mm) | treatment | 0.5 | - 1.9 | - 2.4 | |
| | control | 0.1 | - 0.6 | - 0.7 | |
| Maxillary Length PNS-A (mm) | treatment | 43.8 | 46.1 | N.S. | |
| | control | 44.5 | 45.9 | | |
| Lower Face Height Me-ANS (mm) | treatment | 56.0 | 61.2 | N.S. | |
| | control | 57.0 | 60.4 | | |
| Lower Incisor to Mand. Plane (°) | treatment | -- | 97.0° | N.S. | |
| | control | -- | 94.0° | | |
| Class II Canine Relation (mm) | treatment | 1.6 | 0.1 | -1.5 | |
| | control | 1.7 | 1.4 | -0.3 | |
| Class II Molar Relation (mm) | treatment | 0.6 | -1.3 | -1.9 | |
| | control | 0.5 | 0.4 | -0.1 | |

Conclusions: The length of the mandible increased greater in the treatment group by 3.9mm as compared to the control sample over a 3-year period with passive wear of the appliance only while sleeping. The overbite and overjet also had a significant decrease compared to the control sample while there were no differences in the maxillary height or length when compared to the control group.

3) A Summary of "The Prevention of Overbite and Overjet development in the 3 to 8 year-old by controlled nighttime guidance of incisal eruption: A study of 43 individuals. Methenitou, S., Shein. B, Ramanathan, G., Bergersen, E.O., J of Pedod., 14:219-230, 1990. A study of the Nite-Guide technique from 3 to 8 years and how this preventive/interceptive method of orthodontics works.

Sample size, Treatment sample=43 (16 males, 27 females)
Control sample=50 (25 males, 25 females)

Appliances worn only passively at night: Patients seen every two months.

All conclusions are result of significant statistical differences ($P < .01$)

1. The maxillary permanent incisors were prevented from overerupting, which changed the overbite from a mean 4.22mm in the deciduous to 1.84mm in the permanent anterior dentition. This represents a 96.35% improvement using 1.75mm as the ideal treatment goal. This overbite improvement was accomplished without any increase beyond normal growth in the anterior face height.
2. The overjet was corrected from a mean initial amount of 4.32mm in the deciduous to 1.44mm in the permanent anterior dentition. This represents a 111.7% improvement using a 1.75mm as the ideal treatment goal.
3. This overjet correction occurred without any perceivable restriction in normal forward maxillary growth.
4. The rate (of speed) of growth as well as the ratio of growth of both jaws was the same for both the treatment and control groups.
5. Facial morphology of the treatment group was unaffected when compared to the control sample.
6. None of the treatment group experienced any TMJ symptoms of clicking or crepitus sounds.
7. Lower incisor labial inclination was 40% less in the treatment group when compared to the control sample.
8. Incisal open-bites were corrected with the appliance alone in 20% of cases with a mean improvement of 2.65mm.
9. 93.4% of a sample of 91 patients complied by wearing the appliances as directed.
10. 62% were able to keep the appliance in the mouth all night while sleeping within one week, and 10.5% kept it in all night after 3 weeks.
11. 27.5% wore the appliance only one hour while sleeping to obtain satisfactory results.

Dr. Earl O. BERGERSEN

Dr. Bergersen taught at Northwestern University for twenty-five years on the growth and development of the head and cephalometric radiography.

He has been a guest lecturer at the Universities of Nebraska, Illinois, Loyola University and Marquette University Orthodontic Departments. He developed the Ortho-Tain Preformed.

Positioner in 1968, the Occlus-o-Guide Eruption Guidance Appliance in 1975, and the Nite-Guide Eruption Guidance Appliance in 1989.

He holds more than seventy-five United States and foreign patents. Dr. Bergersen has lectured throughout Europe, the United States, Canada, Asia, Africa, and South America on these appliances.

He has given numerous courses on growth and development research, as well as on the use of skeletal age assessments of maturity in relation to facial and body growth and its influence on orthodontic treatment and retention timing. He is a guest lecturer in the pediatric post-graduate department of the graduate school of dentistry at Tufts University in Boston, Massachusetts.

Master di ortodonzia intercettiva con tecnica Occlus-o-Guide



21 marzo 2009

sweden & martina
ContinuingDentalEducation

Relatori del Master saranno i Numeri Uno dell'Ortodonzia nazionale e internazionale:

Dottor Earl O. Bergersen
Professor Giampietro Farronato
Dottor Gaetano Ierardo
Dottor Irene Malagnino
Dottor Gianni Manes Gravina
Dottor Pietro Manzini
Professoressa Antonella Polimeni

Presso il Centro Congressi Sweden & Martina di Via Veneto, 10 a Due Carrare (PD)

Corso in fase di accreditamento ECM

Per maggiori informazioni chiamare il Numero Verde

o visitare il sito www.sweden-martina.it

Numero Verde
800-010789