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# The effect of headgear timing on number of appointments, personnel costs and orthodontic outcome – a randomized controlled trial

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## Aim

The aim of this study was to assess the effect of cervical headgear (CHG) timing on number of appointments, personnel costs, and orthodontic outcome.

## Material and Methods

A total of 67 participants with a Class II malocclusion were randomized into two groups. CHG was started at the age of 7.8 (SD 0.53) in the earlier group and at the age of 9.7 (SD 0.59) in the later group. The treatment was active until Class I molar relationships were achieved and reduced use was applied when needed. The extraoral force was 500g. Participants were instructed to use the CHG for 8-10 h/night.

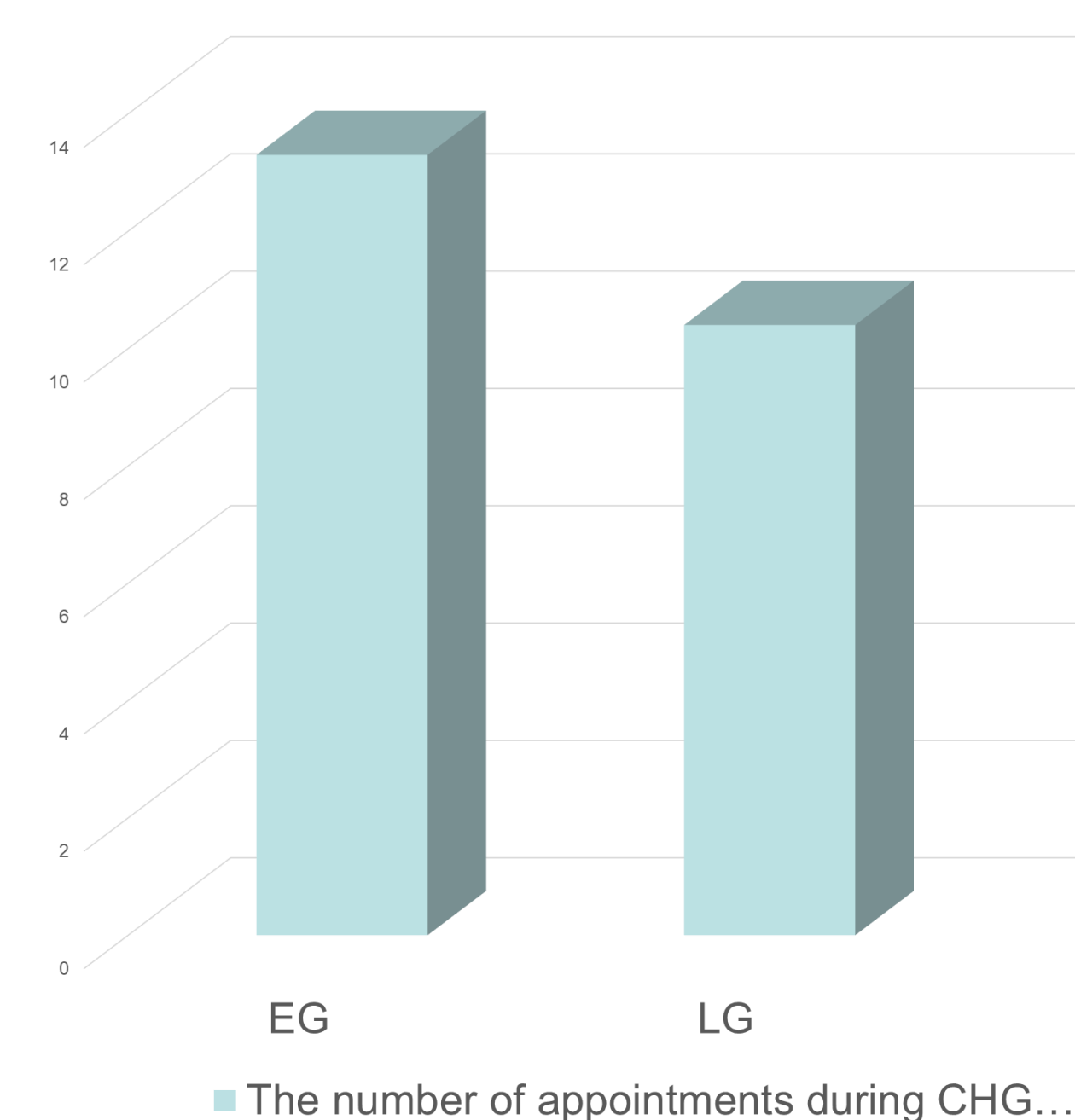
The impressions for dental casts were taken at the age of 7.3 ( $T_0$ , SD 0.56), at the age of 9.5 ( $T_1$ , SD 0.50) and at the age of 11.5 ( $T_2$ , SD 0.62). The dental casts were scanned into 3D-models (3Shape, R700, Denmark). The Peer Assessment Rating (PAR-index) scores at  $T_2$  were determined from the 3D-models with analyzing software to assess the orthodontic outcome (3Shape, Ortho Analyzer 2012, Denmark). The personnel costs of orthodontists, general dentists, dental hygienists, and dental nurses were calculated by using average salaries from 2021. Mann-Whitney U-test were used to evaluate the differences between groups.

## Results

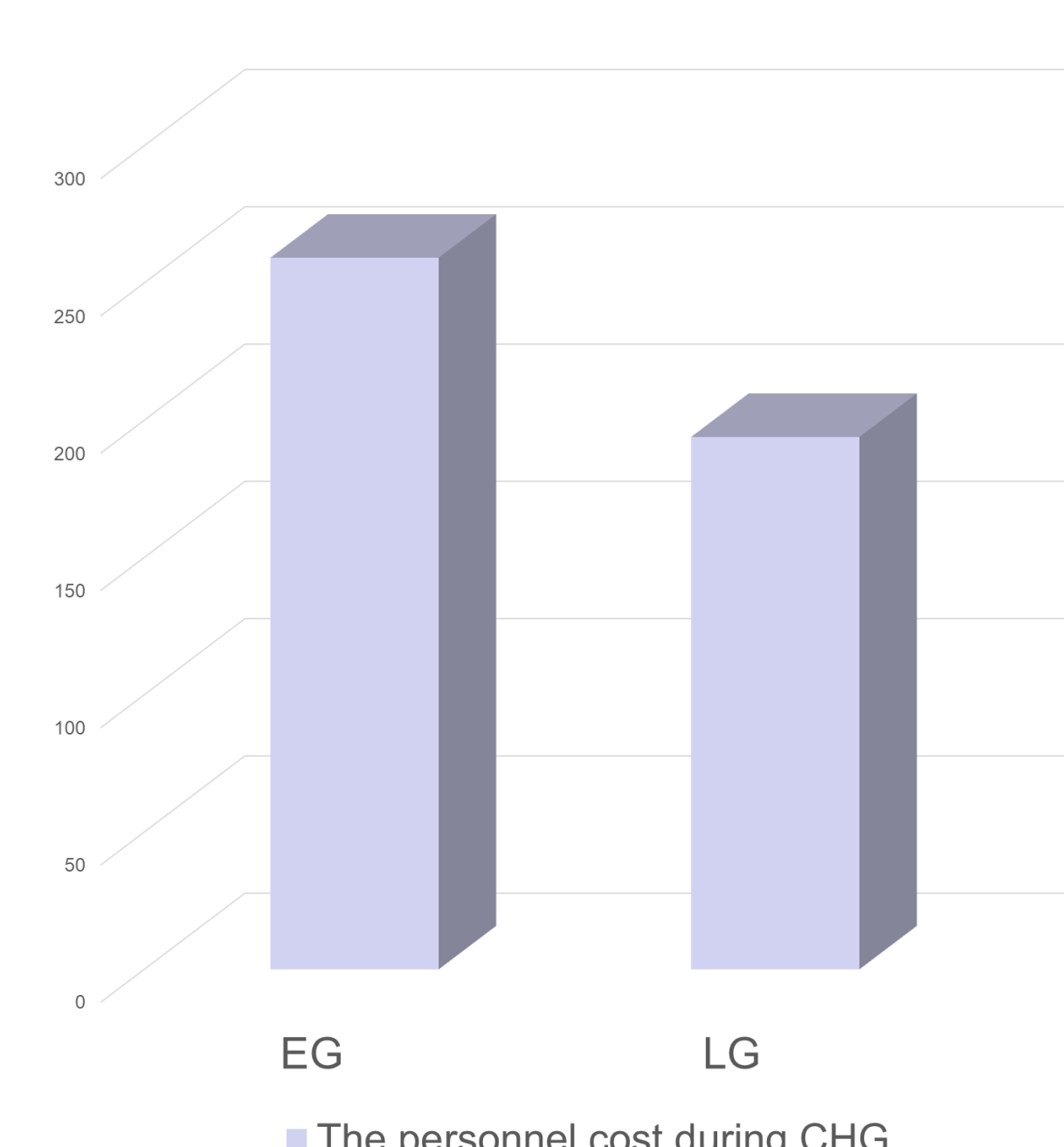
The number of appointments during CHG treatment was 2.9 higher in the earlier group compared to the later group ( $P = 0.01$ ). The personnel costs were 65.3€ higher in the earlier group compared to the later group ( $P = 0.004$ ). There were no significant differences in PAR scores between the groups ( $P = 0.146$ ).

## Conclusions

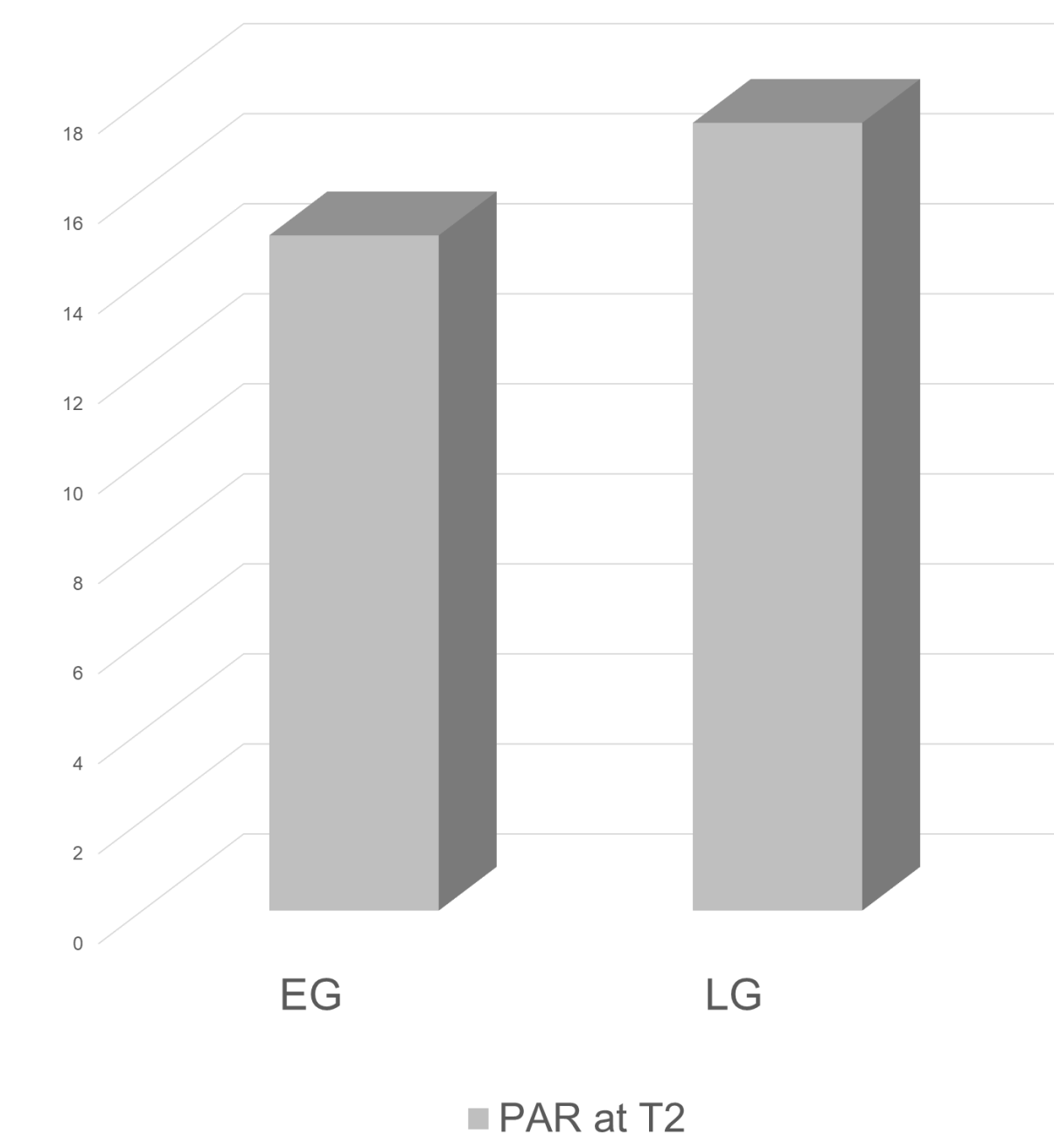
The later timed CHG treatment requires less appointments and produces less personnel costs compared to the earlier timed CHG treatment. The CHG timing has no statistically significant effect on the orthodontic outcome.



**Figure 1.** The number of appointments during CHG treatment.



**Figure 2.** The personnel cost (€) during CHG treatment.



**Figure 3.** The PAR score at T2

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