Acta Odontologica Scandinavica, 2011; 69: 319–320

informa
healthcare

SHORT COMMUNICATION

Estimating costs for shade matching and shade corrections of fixed partial dentures for dental technicians in Germany: A pilot investigation

NICOLETA CORCODEL[1], ANDREAS ZENTHÖFER[1], JÜRGEN SETZ[2], PETER RAMMELSBERG[1] & ALEXANDER J. HASSEL[1]

[1]*Department of Prosthodontics, Dental School, University of Heidelberg, Heidelberg, Germany, and* [2]*Department of Prosthodontics, University of Halle, Halle (Saale), Germany*

Abstract

Aims. To evaluate the additional operating expenses caused by shade matching by dental technicians in the dental practice and by color changes of fixed partial dentures. ***Methods.*** A questionnaire was handed out to visitors of the 2010 ADT dental technician congress in Germany. Thirty-one completed questionnaires were evaluated. ***Results.*** Mean costs caused by shade matching and shade correction per month were 1269$ (SD = 1278$; n = 25) and per unit of FPD 9.32$ (SD = 8.89$). ***Conclusions.*** An improvement of shade matching, shade communication and reproduction should be made in order to minimize the considerable economic damage for dental laboratories.

Key Words: *Shade matching, shade correction, cost, dental technician*

Introduction

The accurate shade of a restoration has become an important aspect of new fixed partial dentures for the patient [1].

The clinical shade matching and the shade communication from the patient in the laboratory and finally the shade reproduction with ceramics are challenging working steps. Visual assessment of color may depend on many influencing variables like external light conditions, metamerism, age, sex, fatigue of the eye, experience and, potentially, color blindness [2] and is, therefore, error-prone. Improvements were developed in the last decades, including electronic shade matching and systematic shade guides [3].

Often, the dental technician is asked to perform the shade matching in the rooms of the dental practice. However, these costs are frequently covered neither by the general state health insurance nor by the patient her/himself. Moreover, if shade corrections were necessary after finishing a fixed partial denture (FPD), the laboratory shade revision is also not remunerated. The additional time required and effort goes, therefore, on laboratories expenses.

The aim of this pilot study was to calculate the costs and economic loss for the dental laboratories due to shade matching and single crowns or FDP's shade corrections.

Materials and methods

An elaborated pseudonymized questionnaire was given to all visitors of the annual meeting of the dental technician congress in Germany, the Working Society for Dental Technologies. In a short briefing, only the owners of independent dental laboratories were asked to complete the questionnaires. Thirty-one questionnaires were filled out and returned from the ~ 250 laboratory owners who attended the meeting (estimated by the meeting committee). The participants were asked about the mean costs for shade matching per month, who of the laboratory personnel usually performs the shade matching, how often it was necessary to perform minor, moderate or extensive shade corrections and what costs this would generate. Finally, the total number of fabricated units of FPD per month had to be estimated. As the survey took place in Germany, the German currency, the Euro

Correspondence: Nicoleta Corcodel, University of Heidelberg Department of Prosthodontics, Im Neuenheimer Feld 400, 69120 Heidelberg, Germany. Tel: +49 6221 56 6082. Fax: +49 6221 56 5371. E-mail: nicoleta.corcodel@med.uni-heidelberg.de

(Received 14 October 2010; accepted 6 February 2011)

ISSN 0001-6357 print/ISSN 1502-3850 online
DOI: 10.3109/00016357.2011.568964

was use in the survey. For a wide-area communication and understanding the Euro currency was converted into US-Dollar. The exchange rate Euro-dollar of the German national central bank on the congress day, 1Eur = 1.19990 US-Dollar, was then used for conversion.

Results

The laboratories fabricated in mean 172.3 FPD units a month (SD = 201.1), from 17.5 to 1000 units.

In mean, shade was matched 12.6 times a month (SD = 9.9; $n = 30$) in a dental practice which caused mean costs of 637.90$ (SD = 722.78$; $n = 26$) per laboratory and 4.83$ (SD = 5.71$) per unit of FPD. In 48.4% of the laboratories shade matching was performed by the laboratory owner (who had to be a master of dental technique) and/or an employed dental technician with the certificated master of dental technique; in the other cases (51.6%) a dental technician, without a master certification, accomplished the shade matching.

In median, 5.7% (range 0–23.3%; $n = 31$) of the FPD units needed shade corrections (small 4%, middle 1.25%, extensive 0.2%). This caused absolute mean costs of 574.39$ (SD = 656.80$; $n = 29$) per month and costs of 4.06$ (SD = 5.61$) per unit.

The mean costs caused by shade matching and shade correction per month were 1269.03$ (SD = 1278.43$; $n = 25$) and per unit of FPD 9.32$ (SD = 8.89$). The deviation of the addition of costs of matching and correction is due to missing answers.

Discussion

The results showed that relevant uncovered costs exist for the dental laboratories due to shade matching and shade corrections for FPDs.

According to the German association of dental technicians, there are 8091 dental laboratories in Germany. Regarding the mean economic damage of 1273.36$ per laboratory and month, this would sum up to a total 123.61 million $ per year in Germany. This deduction is, however, qualified by only a small number of participating laboratory owners. The mean number of fabricated units of FPD ranged from 12.5–1000, indicating a wide range of laboratories, with little to numerous labors. However, in this new topic this pilot study is not representative.

Besides the emerging additional costs the repeated porcelain firings after more or less reworking on the ceramics significantly affects the color of opaque porcelain applied on different dental alloys [4] and also the color stability of all ceramic systems [5].

All this claims for further improvements of the shade taking procedure, the shade communication between the dental practice and dental laboratories and finally the shade reproduction process in order to minimize the economic damage and optimize the effectiveness of the restorative dentistry.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

References

[1] Sikri VK. Color: implications in dentistry. J Conserv Dent 2010;13:249–55.

[2] Hammad IA. Intrarater repeatability of shade selections with two shade guides. J Prosthet Dent 2003;89:50–3.

[3] Paravina RD, Majkic G, Imai FH, Powers JM. Optimization of tooth colour and shade guide design. J Prosthodont 2007;16: 269–76.

[4] Yilmaz B, Özçelik TB, Wee AG. Effect of repeated firings on the color of opaque porcelain applied on different dental alloys. J Prosthet Dent 2009;101:395–404.

[5] Pires-de-Souza Fde C, Casemiro LA, Garcia Lda F, Cruvinel DR. Color stability of dental ceramics submitted to artificial accelerated aging after repeated firings. J Prosthet Dent 2009;101:13–18.