ANALYSIS ON THE PATTERN OF USING THE SERVICE OF REMOVABLE PARTIAL DENTURE MAKING IN A DENTAL LABORATORY IN SURABAYA

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ABSTRAK

Pembuatan gigi tiruan lepasan dilakukan oleh laboratorium gigi. Untuk mempermudah identifikasinya maka dibuat pembagian kelas menurut klasifikasi Kennedy, yaitu Kennedy kelas I,II,III danIV. Untuk menyesuaikan dengan kebutuhan laboratorium gigi mengenai pekerjaan yang sering dilakukan, maka perlu memberikan prioritas pada kasus yang banyak dijumpai dan harus diajarkan kepada mahasiswa D3 Teknik Kesehatan Gigi. Di Surabaya penelitian mengenai macam-macam kasus gigi tiruan sebagian lepasan dengan berbagai klasifikasi Kennedy belum pernah dilakukan. Penelitian ini bertujuan menganalisis pola pemanfataan layanan pembuatan gigi tiruan sebagian lepasan di laboratorium gigi di Surabaya (tahun 2011-2013). Penelitian ini adalah penelitian observasional analitik. Populasi adalah seluruh laboratorium gigi yang ada disekitar kampus FKG UNAIR Surabaya. Sampel penelitian ini adalah seluruh populasi yang bersedia untuk menjadi responden. Pengambilan sampel secara total sampling. Metode pengambilan data dengan menggunakan data sekunder dari laboratorium gigi di Surabaya mulai tahun 2011 sampai 2013. Yang dicatat adalah kasus-kasus gigi tiruan lepasan menurut klasifikasi Kennedy yaitu Kennedy klas I, II, III dan IV. Juga dicatat macam bahan yang digunakan untuk membuat basis gigi tiruan yaitu yaitu resin akrilik heat cured, resin termoplastik dan logam padu Analisis data berupa penyusunan tabel frekwensi sampai pembuatan diagram yang diperlukan, kemudian dianalisa menggunakan tabulasi silang. Jenis gigi tiruan yang terbanyak adalah gigi tiruan fleksibel dan yang paling sedikit adalah gigi tiruan kerangka logam. Kasus yang paling banyak menurut klasifikasi Kennedy adalah kelas III disusul kelas II lalu kelas II dan yang terkhir adalah kelas IV. Simpulan, pada tahun 2011 dan 2013 pembuatan gigi tiruan sebagian lepasan menurut klasifikasi Kennedy Kelas III adalah yang paling banyak ditemui di kedua lengkung rahang atas dan rahang bawah, diikuti Kelas II, Kelas I dan Kelas IV. Tahun 2012 yang terbanyak adalah kelas III diikuti kelas II, kelas IV dan terakhir kelas I. Jenis gigi tiruan yang terbanyak digunakan adalah gigi tiruan fleksibel, diikuti gigi tiruan akrilik dan terakhir adalah gigi tiruan kerangka logam. ***(FMI 2016;52:270-276)***

Kata kunci: *pemanfaatan layanan, basis gigi tiruan lepas, laboratorium gigi*

ABSTRACT

The making of removable denture is performed by a dental laboratory. To facilitate the identification, according to Kennedy classification, classes are divided onto groups, the Kennedy class I, II, III and IV. To suit with the needs of the dental laboratory tasks commonly done, priority are necessary for common cases and should to be taught to students of Dental Health Technology Diploma. In Surabaya, research of various cases of removable partial denture with the various Kennedy classifications has never been done before. This study was to analyze the pattern of service for the removable partial denture manufacture in dental laboratory at Surabaya (2011 – 2013). The research is an observatory analytic. The population is all dental laboratories located around the campus of the Faculty of Dentistry Airlangga University Surabaya. The sample was the whole population is willing to become respondents. Sampling by total sampling. The method of collecting data using secondary data from a dental laboratory in Surabaya from 2011 until 2013. The note is cases removable denture according to the classification of Kennedy that Kennedy Class I, II, III and IV. Also of note kinds of materials used to make the denture base that is heat cured acrylic resins, thermoplastic resins and metals coherent. The data is a compilation table charting the frequency until needed, then analyzed using cross tabulation. Mostly denture type is flexible type and the least is metal framework. Most cases by classification Kennedy is followed by class II class III and class II and more recently is the fourth. In conclusion, in 2011 and 2013 the manufacture of removable partial dentures according to the classification of Kennedy Class III is the most common in both the upper arch and lower jaw, followed by Class II, Class I and Class IV. In 2012 which is the highest grade III followed by class II, class IV and class I. The denture type most used is a flexible denture, followed acrylic denture and the last is the metal framework. ***(FMI 2016;52:270-276)***

Keywords: *service utilization, removable partial dentures, dental laboratory*

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INTRODUCTION

For most people, losing teeth is a big concern, and replacing them with the denture teeth is very important to continue life in normal.Gigi removable partial clone to date is the choice for replacement teeth that are still very popular. This is because the benefits of removable partial dentures that can improve the appearance,

mastication efficiency, restore speech function and improve quality of life (Abdulhadi 2013).

Making the removable denture made by a dental laboratory. Ingredients to make a denture base that is of heat cured acrylic resin, nylon thermoplastic and metal solid (Martin 2004). Its base of acrylic resin more attractive to people because they are relatively cheap, acrylic base color harmony with the surrounding tissue. And its application is also easier when compared with denture metal framework. However denture acrylic resin has the disadvantage that break easily so that made thicker and wide, so people are less comfortable to wear.

Manufacture of removable partial dentures made by a dental laboratory depends kinds of cases of loss of teeth. To facilitate identification then made the class division according to the classification of Kennedy, the Kennedy class I, II, III and IV. In studies that have been conducted from various countries, tooth replacement in patients with removable partial denture case is different. But the distribution of tooth replacement is a good indication of the occurrences in practice and suggest the kinds of removable partial dentures to be made (Pun, 2010).

Dental laboratory in Surabaya often deal-making removable partial dentures with various cases. But surely there is a case that was the most commonly accepted. To adapt to the needs of dental laboratories on the priorities of the work is often done, it is necessary to give attention to the cases that are often found to be taught to students D3 Dental Health. Some countries have done research on the prevalence of manufacture of removable denture with different classifications. But in Surabaya research on the various cases of removable partial dentures has not been done.

Therefore it is necessary to do research on patterns of service utilization manufacture of removable partial dentures in the dental laboratory in Surabaya. The purpose of this study was to analyze the patterns of service utilization manufacture of removable partial dentures in the dental laboratory in Surabaya (2011-2013).

Wide base removable partial dentures

There are several kinds of denture base, the first of which denture metal framework (GTKL). GTKL is one form of removable partial dentures that have long been known in the field of dentistry (Fig. 1). Cast metal frame with metal alloy material which is very strong that cobalt chrome which can be made very thin and very small possibility to fracture (Martin 2004).

Fig. 1. Denture metal framework (Martin 2004).

The second is removable partial denture acrylic resin (RPDs). Dental mock acrylic resin has the advantage among others, the aesthetic is very satisfactory, the price is relatively cheap, are clear, easily shaped with simple tools, non-toxic, does not change the fluid in the mouth, power low water absorption (Fig. 2). But it also has the disadvantage, among others, its low strength and hardness numbers weak, so easily scratched. Or allergic reactions have been known to be associated with excessive residual monomer because the process is not appropriate. This monomer residue serves as a plasticizer and can cause weakening of acrylic resins that can undergo porosity and depreciation (Craig 2002).

Fig. 2. RPDs acrylic (Craig 2002)

Then, the third is a flexible removable partial denture (nylon thermoplastic). Thermoplastic materials for dental prostheses, Valplast (Valplast IntCorp.-USA) and Flexiplast (Bredent -German) lately become a trend, when in fact it was first introduced in dentistry in 1950. Both materials have the same value of Polyamide (nylon thermoplastic). Since its introduction, it has been a lot of interest in thermoplastic material (Negrutiu 2005, Loewe, 2004, Phoenix 2004). Nylon is a resin derived from diamine and dibasic acid monomer. Nylon is a material Thermoplastic denture flexible and easily manipulate it (Fig. 3). From the standpoint of a dental technician, nylon material is versatile and characteristics making it suitable for manufacturing a variety of

applications denture. Because of its very good, nylon is an amazing material for metal replacement applications. However, in dentistry, because of the flexibility contained therein, is used primarily for the network on a flexible partial denture. This material is very flexible so restoration can move with constant and easy installation in the mouth. This material is also extremely bio-compatible (Negrutiu 2005, Phoenix 2004, Keenan, 2003, Parvizi 2004).

Fig. 3. RPDs flexible (Shamnur 2011)

Classification of removable partial dentures

The purpose of the classification of removable partial denture is to simplify identification and to improve teaching methods. Classification also allow longitudinal comparison of various classes on removable partial dentures and to determine whether teaching about the design of removable partial dentures were consistent with the frequency of the use of removable partial dentures. Classification of removable partial dentures are also intended to facilitate communication between dentist, patient and dental technicians (Judy, 2009, Curtis 1992).

The classification should allow longitudinal comparison of the various classes of removable partial dentures (RPDs), especially the trend of the number of cases of various classes RPDs to be made periodically to be used as guidelines for teaching (Judy, 2009). Classification is also intended to facilitate communication about the combination of tooth loss among students, dental practitioners and laboratory technicians (Muneeb, 2013, Abdel-Rahman, 2013, Patel 2014).

Kennedy classification on removable partial dentures (RPDs)

Kennedy classification is a classification that was first discovered by dr. Edward Kennedy at the end of 1925. This classification aims to classify and combine the partially toothless arches. According to Edward Kennedy, classification removable partial dentures are divided into 4 (four). This classification can be used in removable partial dentures in case of loss of teeth, because the presence of this classification allows to quickly see the jaw which had no teeth and determine whether or not planting model of removable partial dentures on an articulator. These classifications include: Class I, II, III and IV (Keyff 2001). Among the various methods of classification like Kennedy, Applegates, Avant, Neurohar, Eichner, ACP (American College of Prosthodontics), Kennedy classification is widely studied and clinically accepted by the dental community. In accordance with the classification of Kennedy, there are four main types of partially edentulous arch is as Class I, Class II, Class III and Class IV. Kennedy classification is widely accepted as the benefits of direct visualization as a supporter of the denture (Jeyapalan 2015).

Kennedy classification is the most widely accepted. In the classification of Kennedy, in addition to the edentulous area which also determines is an attempt to simplify the problem and make use of more universal classification for communication purposes. Despite the fact that the purpose of classification is to simplify the term (Judy, 2009). Classification Kennedy selected to meet this goal. One of the main advantages of classification Kennedy is allowing the direct visualization of the maxillary arch loss of some teeth, and allows the logical approach to the design problem. In addition, Kennedy classification allows the application of the principles of partial denture design, and it is a logical method of classification. Design denture necessary so as not to damage the teeth and oral tissues and will maintain the occlusion in the long term (Keyff 2001).

MATERIALS AND METHODS

This research is an analytic observational study. The population is all dental labs located around the campus of the Faculty of Dentistry Airlangga University Surabaya. The sample was the whole population is willing to become respondents. Sampling by total sampling. The method of collecting data using secondary data from a dental laboratory in Surabaya from 2011 until 2013. The note is cases removable denture according to the classification of Kennedy that Kennedy Class I, II, III and IV. Also of note kinds of materials used to make the denture base that is heat cured acrylic resins, thermoplastic resins and solid metal. The data collection method that uses secondary data from a dental laboratory in Surabaya from 2011 until 2013. The note is cases removable denture according to the classification of Kennedy that Kennedy Class I, II, III and IV. Also note the use of materials. Materials used are heat cured acrylic resins, thermoplastic resins and

solid metal. Then performed the data analysis stage, the first of which is the analysis of the initial data in the form of descriptive analysis will construct a frequency table until charting required. The second is for the analysis of patterns of service utilization manufacture of removable partial dentures in the dental laboratory in Surabaya (2011-2013) using cross-tabulations.

RESULTS

Based on observations at 12 dental laboratory in Surabaya were divided into 3 groups of years of observation (2011, 2012 and 2013) and three groups of denture that is denture metal framework (GTKL), denture acrylic and denture flexible in use in the upper jaw and down according to the classification of Kennedy. In the results, the following analysis.

In 2011 obtained the highest number of utilization on the type of flexible GT for the maxilla and mandible. State opposite the utilization GTKL which have utilization with the lowest amount. The situation is obtained in all group classes Kennedy.

In 2012 obtained the highest number of utilization on the type of flexible GT for the maxilla and mandible. State opposite the utilization GTKL which have utilization with the lowest amount. The situation is obtained in all group classes Kennedy.

In 2013 obtained the highest number of utilization on the type of flexible jaw GT upper and lower jaw. State opposite the utilization GTKL which have utilization with the lowest amount. The situation is obtained in all group classes Kennedy.

Table 1. A cross tabulation use removable partial dentures in 2011

Kennedy Class	Jaw	Denture types			Total
		GTKL	Acrylic denture	Flexible denture	
Kennedy I	RA	117 (7.19%)	663 (40.78%)	846 (62.03%)	1.626(100%)
	RB	254 (10.70%)	832 (35.06%)	1.287 (54.24%)	2.373(100%)
	Total	371 (9.28%)	1.495 (37.38%)	2.133 (53.34%)	3.999(100%)
Kennedy II	RA	88 (5.28%)	815 (49.92%)	763 (45.80%)	1.666(100%)
	RB	195 (8.04%)	984 (40.56%)	1.247 (51.40%)	2.426(100%)
	Total	283 (6.92%)	1.799 (43.96%)	2.010 (49.12%)	4.092(100%)
Kennedy III	RA	394 (11.15%)	1.286 (36.39%)	1.853 (52.46%)	3.533(100%)
	RB	190 (10.62%)	873 (48.79%)	726 (40.59%)	1.789(100%)
	Total	584 (10.97%)	2.159 (40.57%)	2.579 (48.46%)	5.322(100%)
Kennedy IV	RA	53 (4.01%)	604 (45.69%)	665 (50.30%)	1.322(100%)
	RB	164 (6.58%)	984 (39.47%)	1.345 (53.95%)	2.493(100%)
	Total	217 (5.69%)	1.588 (41.63%)	2.010 (52.68%)	3.815 (100%)

Table 2. Cross tabulation of the use of removable partial dentures in 2012

Kennedy Class	Jaw	Denture types			Total
		GTKL	Acrylic	Flexible denture	
Kennedy I	RA	132 (6.58%)	693 (34.56%)	1.180 (58.86%)	2.005 (100%)
	RB	236 (8.38%)	926 (32.89%)	1.653 (58.73%)	2.815 (100%)
	Total	368 (7.63%)	1.619 (33.58%)	2.833 (58.79%)	4.820 (100%)
Kennedy II	RA	80 (4.50%)	765 (43.07%)	931 (52.43%)	1.776 (100%)
	RB	223 (6.22%)	1.127 (31.42%)	2.236(62.36%)	3.586 (100%)
	Total	303 (5.65%)	1.892 (35.29%)	3.167 (59.06%)	5.362 (100%)
Kennedy III	RA	423 (10.13%)	1.298 (31.08%)	2.455 (58.79%)	4.176 (100%)
	RB	182 (5.99%)	976 (32.17%)	1.876 (61.84%)	3.034 (100%)
	Total	605 (8.39%)	2.274 (31.54%)	4.331 (60.07%)	7.210 (100%)
Kennedy IV	RA	84 (2.93%)	649 (22.64%)	2.134 (74.43%)	2.867 (100%)
	RB	145 (7.01%)	986 (47.63%)	939 (45.36%)	2.070 (100%)
	Total	229 (4.64%)	1.635 (33.12%)	3.073 (62.24%)	4.937 (100%)

Table 3. Cross tabulation of the use of removable partial dentures in 2013

Kennedy Class	Jaw	Denture types			Total
		GTKL	Acrylic	Flexible denture	
Kennedy I	RA	169 (7.26%)	851 (36.57%)	1.307 (58.17%)	2.327 (100%)
	RB	233 (7.37%)	1.084 (34.27%)	1.846 (58.36%)	3.163 (100%)
	Total	402 (7.32%)	1.935 (35.25%)	3.153 (57.43%)	5.490 (100%)
Kennedy II	RA	94 (3.94%)	904 (37.89%)	1.388 (58.17%)	2.386 (100%)
	RB	259 (7.21%)	1.348 (37.51%)	1.987 (55.28%)	3.594 (100%)
	Total	353 (5.90%)	2.252 (37.66%)	3.375 (56.44%)	5.980 (100%)
Kennedy III	RA	427 (8.47%)	1.857 (36.85%)	2.756 (54.68%)	5.040 (100%)
	RB	277 (7.94%)	1.341 (38.45%)	1.870 (53.61%)	3.488 (100%)
	Total	704 (8.26%)	3.198 (37.50%)	4.626 (54.24%)	8.528 (100%)
Kennedy IV	RA	145 (6.03%)	829 (34.49%)	1.429 (59.48%)	2.403 (100%)
	RB	213 (6.19%)	1.243 (36.11%)	1.986 (57.70%)	3.442 (100%)
	Total	358 (6.12%)	2.072 (35.45%)	3.415 (58.43%)	5.845 (100%)

Table 4. Significance test the effect of jaw position against this type of use of denture

Kennedy Class	Year 2011	Year 2012	Year 2013
Kennedy I	0.000*	0.051	0.206
Kennedy II	0.000*	0.000*	0.000*
Kennedy III	0.000*	0.000*	0.279
Kennedy IV	0.000*	0.000*	0.396

* = There are differences in patterns of usage for denture significant between the upper and lower jaw

In 2011 obtained different pattern of usage for denture significant between the upper and lower jaw to the entire class of Kennedy. In the year 2012 was no difference in the pattern of usage for denture significant between the upper and lower jaws to class Kennedy II, III, and IV, while for class Kennedy I use the type of denture insignificant between the upper and lower jaws to class Kennedy I, III and IV, while for class II Kennedy found significant differences in the pattern.

DISCUSSION

This study evaluated the use of the type of removable partial dentures (RPDs) that denture metal framework (GTKL), removable acrylic partial dental (GT SL acrylic) and denture flexible (flexible GT) on 12 private commercial dental labs in Surabaya. Dental laboratory has a duty to assist the dentist in efforts to rehabilitate patients teeth. From the history of dentistry has always strived to improve the quality or the quality of dental health services to meet the evolving needs. Especially in the field of Prosthodontics should evaluate these trends to determine the needs and future plans. We conducted a cross sectional study is to project the data on the use of removable partial dentures (RPDs) using the classification according to Kennedy. RPDs types studied were denture metal framework (GTKL), denture acrylic resin (acrylic resin GT) and flexible denture (GT flexible). This study was designed to gather information about the production RPDs made by private commercial dental labs in Surabaya. That information is certainly very helpful in connection with the manufacture RPDs teaching.

Comparison of utilization GTKL, GT and GT acrylic flexible.

From the results obtained in the utilization RPDs in 2011, 2012 and 2013 it appears that the amount of the highest utilization on the type of flexible GT for maxilla and mandible in all classes of classification. State opposite the utilization GTKL which have utilization with the lowest amount. The condition is found in whole-class group classification Kennedy. GT flexible utilization of the most widely due to various advantages possessed by the GT. The concept of a flexible resin based on the flexibility and the ability to pass through hard and soft tissue to enter the stricken retention. Therefore, in cases like Kennedy class I & II, which involves the distal extension, election flexible denture is very appropriate because it can grip the teeth adjacent to obtain excellent retention. Flexible denture can also absorb a small amount of water that makes the denture becomes softer and compatible to the network, also will not warp or become brittle. This flexible denture aesthetically very superior. Also easy to install and remove, so people feel comfortable. Biocompatible also very good because the material is free of monomer and metal, this is the principle in patients who are allergic to

conventional denture material (Kaira 2012, Chittaranjan 2009).

The research we have done is not in accordance with that by Pun, 2010, namely that the use of removable partial denture acrylic far less than GTKL. Usage GTKL 73% while the GT and GT acrylic flexible only 27%. Based on research conducted by Pun 2010 in the state of Wisconsin, USA, in the form of data relating to the manufacture of conventional metal denture frameworks. While this simple analysis of the design of the metal framework cannot provide the data that is realistic in terms of the care given to the majority population. While the results of long-term data are valid still lacking. Denture acrylic resins continue to be used with great frequency. It has been demonstrated in several countries, where the removable partial denture acrylic resin is preferable to removable partial denture metal framework. Although a comparative study between removable partial denture frameworks metals and non-metals are still lacking, but still able to show that the non-metallic dentures are often chosen for economic reasons (Curtis 1992).

Survey denture use among 469 private dental technicians in Singapore. Only 172 (37%) response is received. The study reported that the denture acrylic resin is recommended for all cases (Thean 1996). Research in 2007 to collect 131 written record of five dental laboratories in the Kingdom of Bahrain for two months. 89% of the data state that removable partial dentures that most of the denture acrylic resin. Schwarz and Barsby, 1980 discussed the fact that many dentists in the United Kingdom surveyed provide denture acrylic resin for the National Health Service. They also estimate that the proportion of dentures with metal framework denture acrylic resin is 1 to 7. Another recent analysis of the UK and Ireland by Lynch and Allen, 2007. Reviewing the educational aspects of removable partial dentures, they also reported the frequency denture metal framework and denture acrylic resin. A ratio indicates that the metal framework denture compared denture acrylic resin is 3:2. The data obtained in eleven dental schools. These figures show a significant difference between educational institutions, government subsidized, and the treatment of private practice (Radhi 2007). Making partial removable denture acrylic resin is about 10% in North America, while production in Sweden is 35%. This comparison is greater for Poland, where production of denture acrylic resins by 87% and in the Netherlands by 90%. It may be related to factors of practical and financial, are decisive to choose to use denture acrylic resin. (Owall 1999). Research conducted in 1995 at the university who teaches general dental practitioners in the state of Singapore on the use of removable partial dentures showed that acrylic removable partial dentures seem to be the preferred choice for denture care (Thean 1996).

The comparison of classification cases Kennedy Class I, II, III, and IV.

In 2011 and in 2013 it appears that most of the largest RPDs manufacture class III followed Kennedy class I and class II then the least is the fourth grade. Results were the same as research that has been done by stating that the case is the most that followed Kennedy III class I and class II then the least is the fourth grade (Farias-Neto, 2012, Prabhu 2009).

In 2012 it appears that most of the largest manufacture RPDs Kennedy class II class III followed then the class IV and the least is class I. The results were the same as research conducted by Sapkota (2013) which states that the case is the most that Kennedy class III followed I then class II and which is at least the fourth grade. From all the data already analyzed it appears that Kennedy class III predominant, it comes from the fact that adults retain more teeth in hidupnya.23 tendency to manufacture removable partial dentures have been reported in many studies. Removable partial dentures Kennedy class I the most is on the lower jaw. However, class III the most is in the upper jaw. In the region of Eastern Wisconsin case classification Upper Kennedy Class I jaw denture configuration remains the most widely followed by the class III, class II and class IV, while the lower jaw is at most III.3 class research that has been done by Abdulhadi showed that patients who made removable partial dentures are ethnic Chinese majority as compared to other ethnic groups. Kennedy classification that most of the class III. Research on the type of removable partial dentures are made at the local dental laboratory has also been done then compare these findings with data from previous studies. The results showed that the removable partial denture lower jaw more than the upper jaw (Abdulhadi 2013). Also obtained findings removable partial dentures that most Class I Kennedy made, and the least is the fourth grade (Judy, 2009, Curtis 1992).

CONCLUSION

In 2011 and 2013 the use of removable partial dentures according to the classification of Kennedy's most commonly found in both the upper arch and lower jaw are grade III followed by class II, class I and latter is a class IV. In 2012 the vast majority were followed by class II class III, class IV and class I. The latter type denture utilization is the most flexible, followed denture acrylic denture and the last is the metal framework.

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