DENTIN
JURNAL KEDOKTERAN GIGI
Vol VII. No 1. April 2023

THE NEED FOR MALOCCLUSION TREATMENT AT 12-14 YEARS BASED ON IOTN-AC IN SOUTH DAHA DISTRICT

Sherly Nuralisa Sinay[1)], Diana Wibowo[2)], Aulia Azizah[3)]
[1)] Faculty of Dentistry, University of Lambung Mangkurat, Banjarmasin, Indonesia
[2)] Departement of Orthodontics, Faculty of Dentistry, University of Lambung Mangkurat, Banjarmasin, Indonesia
[3)] Departement of Dental Public Health, Faculty of Dentistry, University of Lambung Mangkurat, Banjarmasin, Indonesia

ABSTRACT
Background: *Malocclusion is a deviation that occurs in the teeth or malrelation of the dental arch that is not within the normal range. The prevalence of malocclusion in Indonesia is very high at 80%. Malocclusion cases in South Kalimantan Province with the age group of 12-14 years were 15.6%. The malocclusion index that the researcher used in this study was the Index of Orthodontic Treatment Need (IOTN) using the Aesthetic Component (AC).* ***Purpose:*** *To identify the level of need for malocclusion treatment at the age of 12-14 years based on IOTN-AC in South Daha District.* ***Material and Methods:*** *This study uses descriptive method with cross-sectional approach. The number of samples is 110 samples. Data analysis was carried out by using descriptive analysis.* ***Result:*** *The highest level of malocclusion treatment needs at the age of 12 years was score 3 by 31% and those who needed more treatment were male. The level of malocclusion treatment needs the most at the age of 13 years is score 2 by 36% and the male gender is the most in need of treatment. The level of malocclusion treatment needs the most at the age of 14 years is score 2 by 29% and the female gender is the most in need of treatment.* ***Conclusion:*** *The highest level of malocclusion treatment needs at the age of 12-14 years in South Daha District is score 2 (not requiring treatment) of 31% and those who need more treatment are male in South Daha District.*

Keywords: *Adolescent, IOTN-AC, Malocclusion*
Correspondence: Sherly Nuralisa Sinay, Faculty of Dentistry, University of Lambung Mangkurat, Jalan Veteran No 12B, Banjarmasin, Indonesia; E-mail: sherlysinay5@gmail.com

INTRODUCTION

Dental and oral disease is something that needs to be considered in Indonesia. Based on the results of the 2018 national Basic Health Research (Riskesdas), it shows that the prevalence of dental and oral problems in Indonesia is 57.6%. The prevalence of dental and oral problems in South Kalimantan Province is 59.6% and in South Hulu Sungai District is 63.39% which is the 6th highest rank out of 13 districts or cities in South Kalimantan Province.[1,2] Dental problems and The mouth that often appears is dental caries or cavities, the second is periodontal disease, and the third is malocclusion.[3]

Occlusion is the relationship between the upper and lower jaws in contact. Abnormalities of the relationship of the upper and lower jaws can be called malocclusion. Malocclusion is a deviation that occurs in the teeth or malrelation of the dental arch that is not within the normal range.[4,5]

The results of Riskesdas in 2018 show that children in their growing period often experience problems with their teeth. Problems with the teeth and mouth in the age group 10-14 years by 55.6%, in the age group (WHO) aged 12 years by 53.4% who experience dental and oral problems.[1] The prevalence of malocclusion in Indonesia is very high at 80%. this is due to the lack of public awareness about dental care. Malocclusion cases in South Kalimantan Province with the age group of 12-14 years were 15.6%, which is the highest percentage in the category compared to those aged ≥ 15 years. Based on the results obtained, it shows that the

community needs to know and pay attention to the level of malocclusion treatment needs at an early age of growth and development because malocclusion can also have a negative impact on the psychological condition and aesthetic level of a person's face according to their gender.[6,7] Assessment of malocclusion conditions is carried out using an index system.[8] Abnormalities in the position of the teeth can be measured using a malocclusion index.[9]

Malocclusion index is an assessment of the severity of malocclusion that can be done using a standard malocclusion assessment. The malocclusion index used in this study is the Index of Orthodontic Treatment Need (IOTN).[9] The Index of Orthodontic Treatment Need (IOTN) consists of two components, namely the Aesthetic Component (AC) and Dental Health Component (DHC). Aesthetic Component (AC) is done by comparing the results of photos of the anterior teeth with the results of photos of the aesthetic components of the IOTN. Most researchers think that this index is considered reproductive and effective for ensuring the aesthetic level of the patient's perception, and it will be faster and more useful to use the Aesthetic Component (AC) to determine the level of treatment need, although it has the disadvantage of not being able to see the condition of the posterior teeth.[10,11,12]

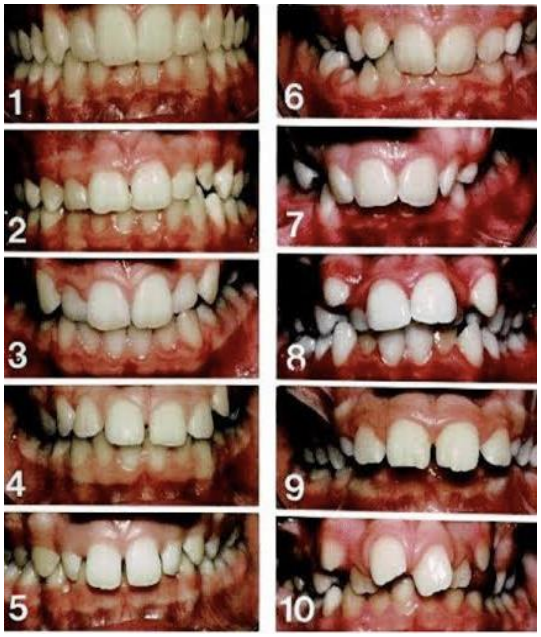
Based on the description above, researchers are interested in doing this research because research on IOTN-AC is still very rarely done, and the potential for using the IOTN-AC index is effective in determining the level of need for malocclusion treatment. Researchers have also conducted a preliminary survey and found that in Hulu Sungai Selatan Regency there is still a lack of data regarding the level of care needs and the condition of the teeth in South Daha District, so researchers are interested in researching the level of need for malocclusion treatment there. The purpose of this study was to identify the level of need for malocclusion treatment at the age of 12-14 years based on IOTN-AC in South Daha District.

MATERIALS AND METHODS

The research was carried out after obtaining ethical approval from the Ethics Committee of the Faculty of Dentistry, University of Lambung Mangkurat with No. 064/KEPKG-FKGULM/EC/V/2022. This study uses a descriptive method with cross-sectional approach in South Daha District. The sample selection technique used purposive sampling technique, namely the sample selection technique selected in accordance with the provisions and criteria of the researcher. The inclusion criteria determined by the researcher were adolescents aged 12-14 years, cooperative or willing to be used as research samples, parents/guardians signed an informed consent, complete anterior teeth, adolescents did not experience underbite (the position of all lower anterior teeth is more advanced than the upper jaw) or a prognathic mandibular position because it cannot be identified on the IOTN-AC score. The exclusion criteria were that the photos obtained were inaccurate so they could not be used (such as blurry photos, cropped photos that did not cover all of the anterior teeth, and dark photos), and teenagers who had symptoms of Covid-19.

The total population of adolescents aged 12-14 years in South Daha District is 3994 people. The number of respondents who were able to use the Slovin formula were 110 people aged 12-14 years who had been selected according to the inclusion and exclusion criteria. The data taken is primary data obtained directly by the researcher by taking photos of the research sample, then making comparisons using photos of the IOTN aesthetic components, and categorizing scores based on the photos of the IOTN aesthetic components. Data analysis was carried out by using descriptive analysis using diagrams and tables. The tools and materials used in this study were hazmat, handscoon, mouth mask, chlorine solution and detergent for sterilizing cheek retractors, hair caps, hand sanitizers, tissue, plastic, cameras, stationery, google glasses, and cheek retractors.

Aesthetic Component (AC) is used to examine the aesthetic level of cases of malocclusion that can affect a person's psychosocial condition. Aesthetic Component (AC) assessment standard can be seen from a set of photos arranged by grade or level from 1 to 10. Level one shows an attractive patient aesthetic, while level 10 shows a patient aesthetic that is unattractive or very aesthetically disturbing. Color photos are used to compare with the patient, while black and white photos are used to compare them with the model. The assessment method is carried out by comparing the Aesthetic Component (AC) photo with the patient's status seen from the anterior aspect, then it is determined based on the aesthetic level which is approximately the same as the patient's condition.[13]

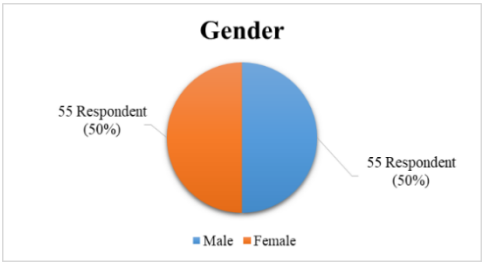


Picture 1. IOTN Aesthetic Components

The assessment score is determined based on the level of care need as follows:
1. Score 1-2 = Does not require treatment.
2. Score 3-4 = Slightly need for treatment.
3. Score 5-7 = Moderately in need of treatment.
4. Score 8-10 = Urgently needs treatment.[13]

RESULT

The following is a description of the characteristics and frequency distribution of respondents from the research results that have been processed in the form of tables and diagrams as follows:



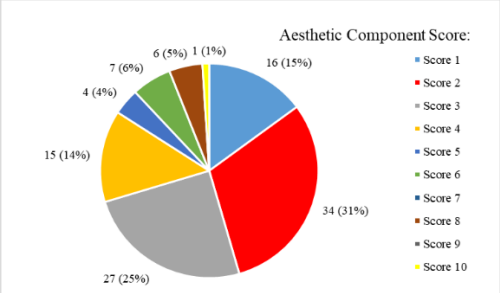
Picture 2. Characteristics of Research Respondents Based on Gender in South Daha District.

The results of the study in picture 2 show that the total number of male respondents is as much as the total number of female respondents, namely 55 people (50%).

Table 1. Characteristics of Research Respondents Based on Age in South Daha District.

Age	Frequency (n)	Percentage (%)
Age 12	26	23,64%
Age 13	42	38,18%
Age 14	42	38,18%
Total	**110**	**100%**

The results of the study in table 1 show that the majority of research respondents were aged 13 and 14 years, each of which was 42 people (38.18%) compared to respondents aged 12 years.



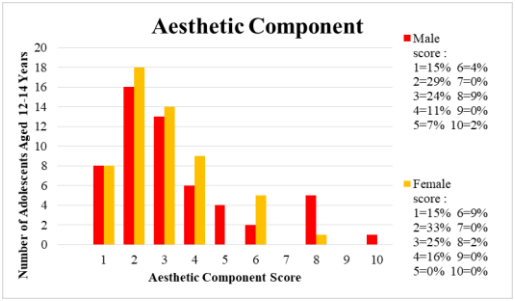
Picture 3. Frequency Distribution Diagram of Malocclusion Treatment Needs at Age 12-14 Years Based on IOTN-AC in South Daha District seen from AC Score 1-10.

The frequency distribution of the need for malocclusion treatment as shown in picture 3 was obtained from the results of the assessment based on the IOTN-AC on adolescent anterior teeth photos. The highest level of malocclusion treatment needs is a score of 2 (does not require treatment) with 34 people (31%) of 110 respondents (100%) aged 12-14 years in South Daha District. The lowest level of malocclusion treatment needs was a score of 7 (moderately in need of treatment) and a score of 9 (urgently needs treatment) which was not obtained by adolescents with that score category (0%).

Table 2. Malocclusion Treatment Needs Level in South Daha District.

Score	Malocclusion Case Treatment Need Level	n	%
1-2	Does not require treatment	50	45%
3-4	Slightly need for treatment	42	38%
5-7	Moderately in need of treatment	11	10%
8-10	Urgently needs treatment	7	6%
TOTAL		110	100%

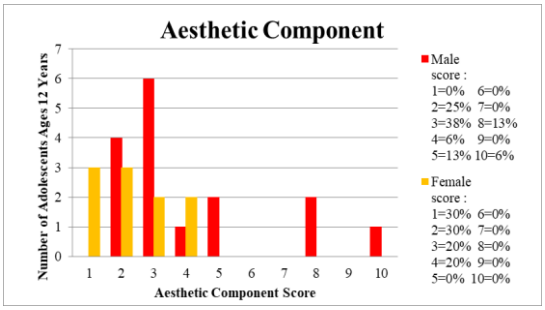
Based on table 2, the percentage results that really need treatment in South Daha District are 6% (7 out of 110 respondents).



Picture 4. Frequency Distribution Diagram of the Level of Malocclusion Treatment Needs at the Age of 12-14 Years Based on IOTN-AC in South Daha District seen from Gender.

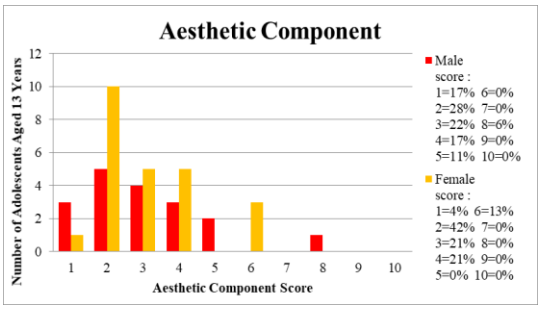
Based on picture 4, the results of the IOTN-AC score show that the male gender requires more care than the female gender. The results are seen based on the score that requires treatment, namely a score of 3-10, with the percentage of men 31 people (57%) more than women 29 people (52%) from 55 respondents in each gender. Based on the severity, the researchers also saw from a score of 8-10 (urgently needs treatment) which was a very severe case of malocclusion with a percentage of 6 males (11%) which was more than 1 female (2%) out of 55 respondents in each gender.

Based on the results of the research above, the researcher wants to describe the specifications for each age.



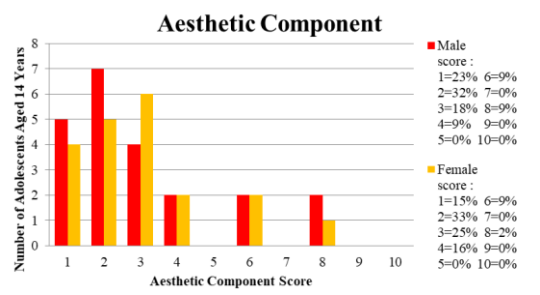
Picture 5. Frequency Distribution Diagram of the Need for Malocclusion Treatment at the Age of 12 Years Based on IOTN-AC in South Daha District.

The total respondents who were obtained at the age of 12 years were 26 respondents. Based on picture 5, the most common IOTN-AC score found is a score of 3 (slightly in need of treatment) as many as 8 people (31%) of 26 respondents and the least score is a score of 6,7 (moderately in need of treatment), and a score of 9 (urgently needs treatment) which the respondent did not get with that score category (0%). The results of the IOTN-AC score indicate that the male gender requires more treatment than the female gender. The results are seen based on the score that requires treatment, namely a score of 3-10, with the percentage of male 12 people (75%) from 16 respondents more than women 4 people (40%) from 10 respondents. Based on the severity level, the researcher also saw from a score of 8-10 (urgently needs treatment) which was a very severe case of malocclusion with a percentage of 3 males (19%) 16 respondents and no female respondents aged 12 years with that score category (0 %).



Picture 6. Frequency Distribution Diagram of Malocclusion Treatment Needs at the Age of 13 Years Based on IOTN-AC in South Daha District.

The total respondents who were obtained at the age of 13 years were 42 respondents. Based on picture 6, the most common IOTN-AC scores found were score 2 (does not require treatment), as many as 15 people (36%) from 42 respondents and the least score was score 7 (needed enough treatment), score 9 and 10 (urgently needs treatment) which the respondent did not get with that score category (0%). The results of the IOTN-AC score indicate that the male gender requires more treatment than the female gender. The results are seen based on the score that requires treatment, namely a score of 3-10, with the percentage of men 10 people (56%) from 18 respondents more than women 13 people (55%) from 24 respondents. Based on the severity level, the researchers also saw from a score of 8-10 (urgently needs treatment) which was a very severe case of malocclusion with a male percentage of 1 person (6%) from 18 respondents and no female respondents aged 13 years with that score category (0%).



Picture 7. Frequency Distribution Diagram of Malocclusion Treatment Needs at the Age of 14 Years Based on IOTN-AC in South Daha District.

The total respondents who were obtained at the age of 14 years were 42 respondents. Based on picture 7, the most common IOTN-AC scores found were score 2 (does not require treatment) as many as 12 people (29%) from 42 respondents and the least score was score 5,7 (slightly in need of treatment), scores 9 and 10 (urgently needs treatment) which the respondent did not get with that score category (0%). The results of the IOTN-AC score indicate that the female is more in need of care than the male gender. The results are seen based on the score that requires treatment, namely a score of 3-10, with the percentage of men 10 people (45%) from 22 respondents which is less than women 11 people (55%) from 20 respondents. Based on the severity level, the researcher also saw from a score of 8-10 (urgently needs treatment) which was a very severe case of malocclusion with a percentage of 2 men (9%) from 22 respondents and 1 woman (5%) from 20 respondents.

DISCUSSION

Malocclusion is a deviation that occurs in the teeth or abnormalities in the relationship of the dental arches that are not in the normal range. This malocclusion can occur in the form of an abnormal jaw size, the condition of the teeth that are not in accordance with the formation, missing teeth, excessive number of teeth, tooth size abnormalities, as well as environmental factors such as finger sucking and trauma or injury.[5] This study used the Index of Orthodontic Treatment Need - Aesthetic Component (IOTN-AC) which is used to measure the severity of malocclusion of adolescent teeth that have entered the stage of permanent teeth. Score of 1 on the aesthetic component of IOTN did not reveal any dental abnormalities. Score of 2 showed a small diastema between the two maxillary central incisors and a slight open bite on the canines and a shift in the median line. Score of 3 showed that there was an anterior open bite and the canines were slightly ectopic in the maxilla but normal in the mandible. Score of 4 showed an open bite and diastema on the maxillary anterior teeth and ectopic canines. Score of 5 shows the presence of a diastema between the maxillary anterior teeth and a deep bite. Score of 6 showed the presence of a deepbite where the maxillary teeth almost covered the teeth in the lower jaw and there was a slight diastema, openbite, and crowding of teeth on one side of the anterior teeth. Score of 7 showed a deep bite so severe that the mandibular anterior teeth were covered by the maxillary anterior teeth. Score of 8 shows the position of the ectopic canines in the upper jaw and crowding of the teeth in the lower jaw. Score of 9 showed a severe deepbite condition accompanied by the presence of diastema between the maxillary anterior teeth. Score of 10 shows rotation of the maxillary anterior teeth as well as open bite and ectopic teeth or teeth that erupt outside the arch.[14]

The severity of malocclusion based on picture 3 shows that the highest IOTN-AC results are in category score 2 (does not require treatment), as many as 31% of respondents aged 12-14 years in South Daha District. The results of this study are the same as that of Koloni et al research which found that 90% of respondents were in the category of not needing or needing light treatment at SMP Negeri 1 Wori and Perwira et al research which found that 56% of respondents were included in the category of not requiring treatment at SMP Negeri 1 Salatiga.[10,14] Research Koloni et al and Perwira et al

concluded that the high category that did not require treatment was due to the level of knowledge and awareness of parents in educating their children so as not to do bad habits. The results of this research can be caused by the level of awareness of adolescents about the aesthetics of their teeth, so that these adolescents can pay more attention to and improve the aesthetics of their teeth. Several other supporting factors are a good socioeconomic level, as well as the availability of health facilities that can help prevent malocclusion in adolescents.[15]

The results of the IOTN-AC score in picture 4 show that the male gender requires more care than the female. Based on the results of the study in picture 5 and 6, the most common ages were 12 and 13 years old. This result is similar to that of Rezalinoor et al study which found that the results of the IOTN-AC at SMPN 2 Takisung that males required more treatment than females. This result can be caused by several things, such as in Oley's research (2015) which states that teenage boys at SMAN 3 Tondano tend to prioritize hobbies considering the number of hobbies that can be chosen by men compared to women, so that boys tend to be less care about dental and oral problems that can cause malocclusion. Ningsih's research (2015) states that males aged 12-18 years tend to pay less attention to their dental and oral health conditions than females. This is due to the presence of the SRY (Sex Determining Region) gene that can interfere with the level of emotional control in male adolescents compared to female adolescents.[16] Research by Gupitasari et al concluded that the male gender aged 7-13 years tended to be less obedient and indifferent. on the aesthetic level of their teeth, as well as the lack of education and parental attention while supervising their children, causing the child to have bad habits that can cause abnormalities in his teeth.[17]

The conclusion of the frequency distribution from this research have obtained the highest level of malocclusion treatment needs at the age of 12-14 years in South Daha District is a score of 2 (does not require treatment) which is 31% and the results of the IOTN-AC score at the age of 12-14 years show that the male gender requires more treatment than the female gender in South Daha District. Based on the age category, the results were obtained, namely the level of malocclusion treatment needs the most at the age of 12 years was a score of 3 (slightly in need of treatment) of 31% and the IOTN-AC score at age 12 indicates that the male gender is more in need of care than the female gender. The level of malocclusion treatment needs the most at the age of 13 years is a score of 2 (does not require treatment) by 36% and the male gender requires more treatment than the female gender. The highest level of malocclusion treatment needs at the age of 14 years was a score of 2 (does not require treatment) by 29% and the female gender required more treatment than the male gender.

REFFERENCE

1. Kemenkes RI. Departemen Kesehatan Republik Indonesia. Laporan Hasil Riset Kesehatan dasar (RISKESDAS) Tahun 2018. 195; 2019. P. 195.
2. Kemenkes RI. Departemen Kesehatan Republik Indonesia. Laporan Hasil Riset Kesehatan dasar (RISKESDAS) Provinsi Kalimantan Selatan Tahun 2018. Jakarta: Balitbang Kesehatan Depkes RI; 2018. P. 145-146.
3. Dayataka RP, Herawati H, Darwis RS. Hubungan tingkat keparahan maloklusi dengan status karies pada remaja di SMP Negri 1 Kota Cimahi. Padjadjaran J Dent Res Student. 2019; 3 (1): 43-49.
4. Fitriani, Kurniawan FKD, Wibowo D. Perbandingan nilai indikator maloklusi ringan dengan maloklusi berat berdasarkan indeks HMAR (Handicapping Malocclusion Assessment Record). Dentin (Jur. Ked. Gigi). 2018; 2 (1): 91-96.
5. Ireland R. Dictionary of Dentistry. Translations: Lilian J. Jakarta: EGC; 2014. Occlusion; p. 387, Malocclusion; p. 336-337.
6. Adha MAR, Wibowo D, Rsyid NI. Gambaran tingkat keparahan maloklusi menggunakan Handicapping Malocclusion Assessment Record (HMAR) pada siswa SDN Gambut 10. Dentin (Jur. Ked. Gigi). 2019; 3 (1): 1-9.
7. Arifin R, Sunnati, Siregar RK. Dampak maloklusi gigi anterior protrusif terhadap status psikososial remaja usia 15-17 tahun menggunakan indeks PIDAQ (studi pada 4 SMAN Banda Aceh). Cakradonya Dent J. 2016; 8(2): 132-138.
8. Feroza NA, K. FJD, Wibowo D. Hubungan antara kebiasaan buruk bernafas melalui mulut dan tingkat keparahan maloklusi di SMPN 4 Banjarbaru dan SMAN 4 Banjarbaru. Dentino (Jur. Ked. Gigi). 2017; 2 (1): 40.
9. Damaryanti E, Indrawati E, Firdausi A. Gambaran tingkat keparahan maloklusi pada pasien orthodonti antara tahun 2012-2015 dan 2015-2018 di RS Universitas Brawijaya menggunakan indeks ICON. E-Prodenta Journal of Dentistry. 2019; 3 (2): 240-248.
10. Perwira HN, Riolina A, Rochmanita N. Frekuensi kebutuhan perawatan orthodontic berdasarkan Index of Orthodontic Treatment Need di SMP Negeri 1 Salatiga. Jurnal Ilmu Kedokteran Gigi. 2017; 1 (1): 15-22.
11. Cai Y, Du W, Lin F, Ye S, Ye Y. Agreement of young adults and orthodontists on dental

aesthetics & influencing factors of self-perceived aesthetics. BCM Oral Health. 2018; 18 (113): 1-5.
12. López MFC, Rojo MFG, Rojo JFG, García ARR. Comparison between the ICON index and the esthetic component of the IOTN to determine the need for orthodontic treatment. Revista Mexicana de Ortodoncia. 2017; 5 (1): 10-13.
13. Rahardjo P. Ortodonti Dasar, Ed 2. Surabaya: Airlangga University Press; 2016. p. 63-66, p. 82, p. 198-204.
14. Kolonio FE, Anindita PS, Mintjelungan CN. Kebutuhan Perawatan Ortodonsi Berdasarkan Index of Orthodontic Treatment Need pada Siswa usia 12-13 Tahun di SMP Negeri 1 Wori. Jurnal e-GiGi (eG). 2016; 4(2): 262-263.
15. Suala HN, Wibowo D, Setyawardhana RHD. Kebutuhan Perawatan Ortodonti Berdasarkan Index of Orthodontic Treatment Need pada Remaja (Literature Riview). Dentin (Jur. Ked. Gigi). 2021; 5(3): 132.
16. Rezalinoor MA, Kurniawan FKD, Wibowo D. Gambaran tingkat kebutuhan perawatan ortodonti di SMPN 2 Takisung berdasarkan Index of Oethodontic Treatment Need (penelitian dilakukan di Provinsi Kalimantan Selatan Kabupaten Tanah Laut Kecamatan Takisung Desa Tabanio). Dentino (Jur. Ked. Gigi). 2017; 2(2): 188 – 193.
17. Gupitasari A, Herniyati, Putri LSDA. Prevalensi Kebiasaan Buruk Sebagai Etiologi Maloklusi Klas I Angle pada Pasien Klinik Otodonsia RSGM Universitas Jember Tahun 2015-2016. E-Jurnal Pustaka Kesehatan. 2018; 6(2): 368-369.