

The Effect of a combined Aloe Vera and Chlorhexidine gel on plaque index in children with Cerebral palsy. (Randomized Controlled Clinical Trial)

Anwar sulaiman sabti¹

Chaza nader kouchaji²

Mhd. Isam Hasan Agha³

¹department of pediatric dentistry-faculty of dentistry-Damascus university.
anwar.sabti@damascusuniversity.edu.sy

²prof. department of pediatric dentistry-faculty of dentistry-Damascus university
chaza.kouchaji@damascusuniversity.edu.sy

³prof. faculty of Pharmacy -Damascus university.
misamhasanahha@damascusuniversity.edu.sy

Abstract

Introduction: Background and aim of the research: Oral health and periodontal diseases constitute part of the oral problems in patients with cerebral palsy. Providing oral health care to these patients is extremely difficult due to some of their physical and physical disabilities. Given the existence of a link between oral health and physical health, it was necessary to think about finding solutions to treat their gingivitis without exerting physical and mechanical effort on the part of the child and his family, and the fact that the use of oral rinses GEL is effective in alleviating gingivitis, it requires muscular activity to move it within the mouth, which these patients do not possess, so the move was made to use oral rinses in the form of gel in Aspecial guard. Both chlorhexidine and aloe vera are effective rinses for gingivitis.

The aim of this research was to study the effectiveness of a gel composed of aloe vera and chlorhexidine through its effect on dental plaque in children with cerebral palsy.

Materials and methods: This study was conducted on a group of cerebral palsy (n = 30), whose old ranged between (9-12) years.

A crossover design was adopted in this study, meaning that all sample members would use the four mouth gel sequentially, with a wash-out period of 12 days between each type. Aspecial guard was used, to prevent the gel from leaking into the mouth and to facilitate their application by the child and his family. The mouthwash was applied for 5 days, then plaque index were studied in the time periods before cleaning T0, after cleaning T1, and after use for 5 days T2

The outcome measures for evaluating the effectiveness of the four gel were recording the plaque index according to Quigley and Hein index in the periods T0, T1 and T2, and comparing the difference between the beginning and end of each use.

Results were analyzed using (SPSS 13 edition).

Results: The results showed the efficacy of a combined gel of chlorhexidine and aloe vera, chlorhexidine gel and Aloe vera gel are effective in improving plaque index in children with cerebral palsy in comparison with placebo gel.

Conclusions: It is recommended to apply the combined gel of chlorhexidine and aloe vera within a special guard in children with cerebral palsy.

Keywords : Cerebral palsy, Gingivitis, Aloe vera, Chlorhexidine.

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تقييم فعالية هلام مركب من الألويفيرا والكلورهكسيدين على مشعر اللويحة السنية عند الأطفال المصابين بالشلل الدماغي (دراسة سريرية مضبوطة معشاة)

أنوار سليمان سبتي¹ شذى نادر قوشجي² محمد عصام حسن أغا³

¹طالبة ماجستير، قسم طب أسنان الأطفال- كلية طب الأسنان، جامعة دمشق
anwar.sabti@damascusuniversity.edu.sy

²أستاذ- قسم طب أسنان الأطفال- كلية طب الأسنان- جامعة دمشق

chaza.kouchaji@damascusuniversity.edu.sy

³أستاذ- كلية الصيدلة- جامعة دمشق misamhasanahha@damascusuniversity.edu.sy

الملخص

خلفية البحث وهدفه: تشكل الصحة الفموية و الأمراض اللثوية جزءاً من المشاكل الفموية عند مرضى الشلل الدماغي، ويعد تقديم الرعاية الصحية الفموية لهؤلاء المرضى أمراً في غاية الصعوبة لوجود بعض المعوقات الفيزيائية والجسدية لديهم، ونظراً لوجود رابط بين صحة الفم وصحة الجسد كان لابد من التفكير في إيجاد حلول لمعالجة التهاب اللثة لديهم دون بذل مجهود فيزيائي وميكانيكي من قبل الطفل وأهله، وكون استخدام الغسولات الفموية فعالاً في معالجة التهاب اللثة، إلا أنها تحتاج لفعالية عضلية محرركة ضمن الفم التي لا يمتلكها هؤلاء المرضى، لذلك تم التوجه لاستخدام الغسولات الفموية على شكل هلام ضمن قالب طري لمنع تسربها ضمن الفم، ويعد كلاً من الكلورهكسيدين والألويفيرا من الغسولات الفعالة في التهاب اللثة، وتم مزج كلا المادتين على شكل هلام واحد يطبق ضمن قالب مُصنوع من صفيحة فاكيوم لكل طفل على حدا. وجاء الهدف من هذا البحث دراسة فعالية هلام مركب من الألويفيرا والكلورهكسيدين من خلال تأثيره على مشعر اللويحة السنية عند الأطفال المصابين بالشلل الدماغي.

المواد و الطرائق: أجريت هذه الدراسة على مجموعة من الأطفال المصابين بالشلل الدماغي (n=30)، وتراوحت أعمارهم بين (9-12) سنة، حيث تم اعتماد نظام الدراسة المتصالبة أي أن

جميع أفراد العينة سوف يستخدمون كل هلام فموي بشكل متتابع مع فترة مسح مدتها 12 يوم (دون استخدام أي هلام)، وتم استخدام صفائح الفاكيوم التي صُممت خصيصاً لمنع تسرب الهلام إلى الفم، ولتسهيل تطبيقها من قبل الطفل وأهله، تم تطبيق الهلام الفموي لمدة 5 أيام، ثم تم قياس مشعر اللويحة السنية في الفترات الزمنية قبل النقل T0 وبعد النقل T1 وبعد التطبيق لمدة 5 أيام T2. كانت مقاييس النتائج المتعلقة بتقييم فعالية كل هلام هي تسجيل مشعر اللويحة Plaque index حسب Quigley and Hein index في الفترات T0 و T1 و T2 ومقارنة الفرق بين بداية كل الاستخدام ونهايته، تم تحليل البيانات باستخدام برنامج إحصائي (SPSS إصدار 13)، ولدراسة نتائج الفروقات في درجة مشعر اللويحة بين مجموعات الهلام الأربعة ضمن فترات التطبيق قبل وبعد النقل وبعد 5 أيام من التطبيق، تم استخدام اختبار Kruskal wails. ولتحديد الفروقات الثنائية بين كل مجموعتين من مجموعات الهلام الأربعة على حدة، تم استخدام تحليل Mann Whitney U حيث اعتبر أن هذه الفروقات مهمة عند مستوى ثقة 95%.

النتائج: أظهرت النتائج فعالية الهلام المركب من الألويفيرا والكلورهكسيدين في إنقاص مشعر اللويحة السنية عند مرضى الشلل الدماغي وفعالية كل من هلام الكلورهكسيدين وهلام الألويفيرا بالمقارنة مع الهلام الوهمي.

الخلاصة: ينصح بتطبيق الهلام المركب من الألويفيرا والكلورهكسيدين ضمن صفائح الفاكيوم المصنعة شخصياً عند أطفال الشلل الدماغي.

الكلمات المفتاحية: الشلل الدماغي، التهاب اللثة، الألويفيرا، الكلورهكسيدين.

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The Introduction:

The Oral Health Organization (WHO) defined oral health as :freedom of the mouth from dental caries , gum diseases ,supporting tissues ,oral cancers ,oral manifestations of the acquired immunodeficiency virus (HIV) ,(and clefts of the lip and palate ,and pointed out the importance of detecting ,preventing , or controlling them in their early stages.[1]

Recently ,scientific medical research has proven that the health of the body begins with oral health and that there is a close relationship between oral health and the health of the rest of the organs ,such as the cardiovascular system ,diabetes ,and lung diseases .Therefore ,improving oral health leads to improving physical health and then the quality of life for individuals and improving) society [2] Because it affects individuals physically and psychologically ,it also affects the rate of growth , enjoyment of life ,speech ,chewing ,tasting food , and social communication .[3] Daily oral care by the patient at home also plays an important role in removing supragingival dental plaque .In controlling periodontal diseases and dental caries.[3]

Patients with special needs are known as:

They are patients who suffer from a mild learning disability to severe cognitive dysfunction ,and the individual with special needs is referred to through the following common phrase :He is a child or individual who is unable to carry out some activities ,and is unable to gain experiences with methods available to the average person ,[5] including patients with cerebral palsy who show difficulty in obtaining healthy oral tissues due to some systemic ,functional and physical obstacles . Oral health and periodontal diseases constitute part of the oral problems ,as the rates of infections of the gums and periodontal tissues increase with lower

levels of oral care and the presence of poor health. Occlusal problems and poor physical abilities[13] [14] .[6]

Based on the premise that the ability of children to mechanically remove dental plaque that causes dental caries and gum disease using only a toothbrush is difficult to achieve for most children , especially children with special needs ,due to their inability to use a dental brush and the difficulty that parents face in providing them with dental care and care[15] .

It was necessary to find chemical means to help to obtain an oral environment free or almost free of microorganisms that cause dental caries and periodontal diseases ,and from here came the idea of this study ,through reviewing the medical literature and treatments with complementary and alternative medicine ,which refers to methods of treatment with medical products that do not belong to the family of manufactured chemical medicines , where it is included .Under this label of ingredients , nutritional supplements ,herbal preparations ,and naturally derived products ,we have gained interest in Aloe Vera and its many uses throughout history in medicine.

There are many studies that have compared chlorhexidine and aloe vera in treating gingivitis in adults and a few in children .However ,there is no study that combined the two compounds as one gel , and to the date of this study we have not found a study that evaluated the effectiveness of these rinses on oral health in patients with special needs .There is no study to evaluate the effectiveness of these washes in the form of gel in special molds.

A study by Adam and his colleagues in 2018 demonstrated that using aloe vera as an oral rinse in addition to dental vaccination was more effective than performing tooth scaling alone in alleviating gingivitis and reducing gingival hair in moderate and mild cases of gingivitis[7] [And using aloe vera

rinse was effective in reducing both Plaque , gingival bleeding ,and gingivitis compared to chlorhexidine rinse ,and was an acceptable oral care method among children[8].[19]

The aim of this study is to evaluate the effectiveness of a combined gel of aloe vera and chlorhexidine on dental plaque in children with cerebral palsy.

Materials and methods:

This study was conducted on a group of children with cerebral palsy) n=30 (whose ages ranged between (12-9) years .The cross-over study system was adopted ,meaning that all members of the sample would use each gel sequentially with a scanning period of 12 days .Using vacuum sheets that were specially designed to prevent the gel from leaking into the mouth and to facilitate its application by the child and his family .The oral gel was applied for 5 days ,then the sensors were measured.

Dental plaque in the time periods before scaling T0 , after scaling T1 ,and after application for 5 days T2 . The outcome measures related to evaluating the effectiveness of the four gels were recording the plaque index according to Quigley and Hein index in the periods T0, T1 ,and T2 ,and comparing the difference between the beginning and end of each use.

Sample Gathering:

The sample was collected from children at Al-Haneen Nour and Amal Association for the care and rehabilitation of children with cerebral palsy in the Al-Kiswah area ,rural Damascus .An initial diagnosis was made for all children ,and all dental treatments were performed for each child as needed , after which the patient was entered into the study based on the following inclusion and exclusion criteria:

Inclusion Criteria:

1-Children with cerebral palsy who meet the following conditions:

Children who are cooperative or have the ability to cooperate.

The four upper front incisors are emerging ,healthy , not collapsed ,and not affected by vestibular or palatal caries.

Gingivitis.(2-1)

1
Simple inflammation
Slight discoloration – slight swelling – no bleeding on probing.
2
Moderate inflammation
Edema – smooth ,shiny surface – hemorrhage on probing.

Exclusion criteria:

Children undergoing current dental or orthodontic treatment.

Children who have loss ,collapse ,or absence of one or all of the four incisors.

Suffering from gingivitis (3) or those with advanced gum disease.

Children who used any other oral gel or were treated with antibiotics within 2 weeks before the start of the study or with corticosteroids within 30 days before the start of the study.

People with fluorescent spot.

Those with a history of allergy to any ingredient in the gels used in the study.

Action Steps:

Preparing the gel in the College of Pharmacy with the help of professors of the Department of Drugs and Medicinal Plants.

A meeting was initiated with the patients 'families , explaining to them the treatment method ,the importance of taking care of their children's teeth , and the impact of gum infections,Dental caries

affects the general health of their children, and the effect of cerebral palsy on the gums and teeth.

Then ,the initial examination was conducted and the forms were filled out to enter the research. Dental treatments were also started for them in cooperation with the Oral and Maxillofacial Surgery Hospital at the University of Damascus.

Dental impressions were taken, which was extremely difficult for these patients .Modifications were made to the impression to allow easy and unobtrusive access for patients to take partial anterior impressions. Cleaning of the teeth and gums was performed, after which the impressions were cast, and vacuum plates were made.

In the next session, the patients tested it to ensure the integrity of its edges and good adhesion. The gel was applied for 5 minutes over five consecutive days, pausing for a 12-day scanning period, and then returning to the same steps.

Indicators studied for selecting the sample and used within the context of the study:

Plaque Index (PI) Quigley and Hein 1962: It depends on the amount of dental plaque adjacent to the gingival margin. According to Quigley and Hein 1962, the index is taken after drying the teeth, the plaque is stained with a plaque reagent ,and the index scores are recorded as follows:

0
-No plaque.
1
-Spots separated from plaque at the gingival edge of the tooth.
2
-A thin, continuous strip of plaque up to 1 mm on the gingival edge of the tooth.
3
-A continuous band of plaque larger than 1 mm but covering no more than the cervical third of the tooth.
4
Plaque covers more than one-third of the crown and less than two-thirds of it.
5

-Plaque covers two-thirds of the crown or more.

1. **Study Methods:**

2. **Mouthwashes gel Preparation stage:**

The gel in the study was prepared in the laboratories of the Faculty of Pharmacy at Damascus University according to the formula proposed by the department professors at the Faculty of Pharmacy:

(1000)ml of gel contains glycerin ,sodium saccharin ,Cremophor RH ,(40) sodium benzoate , strawberry flavor ,food coloring) Amaranth red ,(and the active ingredient with agar) until the

mn ml becomes gel-like and easy to apply to the tray for the child without leaking into the child's mouth.

Active ingredient:

Chlorhexidine %0.06 and Aloe Vera %100 in the combined gel and Chlorhexidine %0.12 in the second group.

%100aloe vera in the third group and distilled water in the placebo gel .The basic formula was prepared(glycerin - sodium saccharin - cremophor(40)RH - sodium benzoate - strawberry flavor - food coloring .)Then the resulting quantity was divided into three equal parts and the active ingredient was added to each .

Of which..



The picture indicates the gel formulated with aloe vera and chlorhexidine



The picture indicates each child's vacuum plate with the gel applied.

Results :The research sample consisted of 30 boys and girls ,whose ages ranged between 12–9 years , with an arithmetic average for the sample children 10.4)years .(1 ± They were divided into four

chlorhexidine gel group ,aloe vera gel group , combined chlorhexidine gel group .(And aloe vera , and a group of distilled water) placebo ,(where four types of gel were applied to each child in the sample ,at a rate of 120 applications per sample , and a plaque index reading was taken before scaling ,after scaling ,and after 5 days.

The following tables show the distribution of children in the research sample according to the age and sex of the patient:

Table (1): Distribution of children in the research sample according to age:

SMA ±standard deviation	the highest rate	minimum	number of children	The sex of the child
10.4±1 سنة)	12	9	30	A child with cerebral palsy

Table (2): Distribution of children in the research sample according to the patient's sex:

Percentage			number of children			The child's medical condition
the total	feminine	male	the total	feminine	male	
100	53.3	46.7	30	16	14	A child with cerebral palsy

Table (3): shows the use of the Kruskal walls test to study the results of the differences in the plaque score between the chlorhexidine and aloe vera gel wash group ,the aloe vera gel group ,the chlorhexidine gel group , and the distilled water group within the application periods before ,immediately after ,and 5 days after application.

The decision	P-value	Test value	Average rank	Number of application instances	Oral gel used	Time period
There is a significance	0.001	17.173	70.82	30	Gel composed of aloe vera and chlorhexidine	0
			59.75	30	aloe vera	
			70.82	30	Chlorhexidine	
			40.62	30	Placebo	
There is a significance	0.007	12.023	69.67	30	Gel composed of aloe vera and chlorhexidine	1
			57.67	30	aloe vera	
			69.67	30	Chlorhexidine	
			45.00	30	Placebo	
There is a significance	0.000	68.473	30.70	30	Gel composed of aloe vera and chlorhexidine	2
			47.23	30	aloe vera	
			66.37	30	Chlorhexidine	
			97.70	30	Placebo	

before significant statistically were groups gel four the between differences the ,children palsy cerebral In .(0.000) application after days 5 and ,(P=0.007) cleaning after immediately ,(P=0.001) cleaning U Whitney Mann ,separately groups gel oral two the of each between differences binary the determine To .(4) .No Table in shown as used was analysis

Table (4): shows the results of the Mann Whitney U test for pairwise comparisons between each two groups separately

Meaning of differences	Significance level value	U value	Oral gel used) B(Oral gel used a)(Time period
There is not a significance	0.202	369.5	aloe vera gel	the chlorhexidine gel and aloe vera gel	
There is not a significance	1.000	450.0	the chlorhexidine gel		
There is a significance	0.000	221.0	Placebo		
There is not a significance	0.202	369.5	the chlorhexidine gel	aloe vera gel	
There is a significance	0.029	311.5	Placebo		
There is a significance	0.000	221.0	Placebo		
There is not a significance	0.162	362.5	aloe vera gel	the chlorhexidine gel and aloe vera gel	بعد التنظيف مباشرة
There is not a significance	1.000	450.0	the chlorhexidine gel		
There is a significance	0.003	262.5	Placebo		
There is not a significance	0.162	362.5	the chlorhexidine gel	aloe vera gel	
There is not a significance	0.149	360.0	Placebo		
There is a significance	0.003	262.5	Placebo		
There is a significance	0.007	305.0	aloe vera gel	the chlorhexidine gel and aloe vera gel	أيام 5 بعد
There is a significance	0.000	130.0	the chlorhexidine gel		
There is a significance	0.000	21.0	Placebo		
There is a significance	0.007	280.0	the chlorhexidine ge	aloe vera gel	
There is a significance	0.000	77.0	Placebo		
There is a significance	0.000	136.0	Placebo		

There were significant differences in the plaque score scores before cleaning in the children of the cerebral palsy group between the combined gel group and the distilled water gel group) $P=0.000$.(The plaque score scores were higher in the distilled water gel group than in the composite gel group ,and there were no Significant differences between the combined gel group and the chlorhexidine gel and aloe vera gel groups ($P=1$) ($P=0.202$) ,respectively .The differences were significant between the aloe vera gel group and the distilled water

gel group) $P=0.029$,(as they were lower in the aloe vera gel group compared to their values .In the distilled water gel group ,while it was not significant when comparing the chlorhexidine gel group and the aloe vera gel group) $P=0.202$,(there were significant differences between the chlorhexidine gel group and the distilled water gel group) $P=0.000$,(as the plaque scores were lower .In the chlorhexidine gel group than in the distilled water gel group .The differences were significant in the plaque

index scores in children with cerebral palsy immediately after cleaning between the combined gel group and the distilled water gel group) $P=0.162$, (as they were higher in the combined gel group compared to their values with the gel group). Distilled water, and the differences were not significant between the combined gel group compared to the aloe vera gel and chlorhexidine gel groups ($P=0.162$) ($P=1$), respectively, and the differences between the aloe vera gel group and the chlorhexidine gel groups and distilled water gel were not statistically significant ($P=0.162$) ($P=0.149$), respectively, and the differences were significant between the chlorhexidine gel group and the distilled water gel group) $P=0.003$, (as their values were higher in the chlorhexidine gel group compared to their values in the distilled water gel group). There were significant differences in There were significant differences in the plaque score scores before cleaning in the children of the cerebral palsy group between the combined gel group and the distilled water gel group) $P=0.000$. (The plaque score scores were higher in the distilled water gel group than in the composite gel group, and there were no Significant differences between the combined gel group and the chlorhexidine gel and aloe vera gel groups ($P=1$) ($P=0.202$), respectively. The differences were significant between the aloe vera gel group and the distilled water gel group) $P=0.029$, (as they were lower in the aloe vera gel group compared to their values. In the distilled water gel group, while it was not significant when comparing the chlorhexidine gel group and the aloe vera gel group) $P=0.202$, (there were significant differences between the chlorhexidine gel group and the distilled water gel group) $P=0.000$, (as the plaque scores were lower. In the chlorhexidine gel group than in the distilled water gel group. The differences were significant in the plaque index scores in children with cerebral palsy immediately after cleaning between the combined gel group and the distilled water gel group) $P=0.162$, (as they were higher in the combined gel group compared to their values with the gel group). Distilled water, and the differences were not significant between the

combined gel group compared to the aloe vera gel and chlorhexidine gel groups ($P=0.162$) ($P=1$), respectively, and the differences between the aloe vera gel group and the chlorhexidine gel groups and distilled water gel were not statistically significant ($P=0.162$) ($P=0.149$), respectively, and the differences were significant between the chlorhexidine gel group and the distilled water gel group) $P=0.003$, (as their values were higher in the chlorhexidine gel group compared to their values in the distilled water gel group). There were significant differences in the values of Plaque index scores in children with cerebral palsy after 5 days of cleaning between the combined gel group and the groups of chlorhexidine gel, aloe vera gel, and distilled water gel ($P=0.007$) ($P=0.000$) ($P=0.000$), respectively, as they were lower in the combined gel group. Compared to their values in each of the three groups, the differences were significant between the aloe vera gel group and the chlorhexidine gel and distilled water gel groups ($P=0.007$) ($P=0.000$), as they were higher compared to the values in the chlorhexidine group while they were lower than the values in the distilled water gel group. Plaque score scores were lower in the chlorhexidine group compared to the distilled water gel group, with a statistically significant difference ($P=0.000$).

Chart No (1) shows the results of the comparison of plaque scores in the group of cerebral palsy patients between the types of gel used during the different study periods.

- **Discussion:**

A disease-free oral cavity is the primary goal of dentistry. Effective plaque removal is important and necessary. Plaque is controlled by mechanical and chemical means such as brushing, dental floss, and mouthwashes. However, many patients, especially children, are unable to use these methods, especially those with special needs such as cerebral palsy, so the need has arisen for chemical methods

such as mouthwashes, which have been the preferred method among patients for a long time, as they are easy and do not require manual skill. Chlorhexidine is considered the gold standard for mouthwashes because of its broad spectrum in eliminating gram-negative and gram-positive germs and its effect lasting for 8 hours. However, its side effects, such as discoloration of teeth, restorations, tongue, and taste disturbance, prompted researchers to search for new types to avoid the side effects of chlorhexidine and maintain its effective effect on germs. With the emergence of herbal medicinal products such as Aloe Vera and its wide uses in medicine and dentistry as an oral rinse for adults, thought was made to use both substances in one rinse with a lower concentration than chlorhexidine and to share it with Aloe Vera to have a double effect of eliminating germs, getting rid of dental plaque, and alleviating the effects of gingivitis. It was applied within a mold of a vacuum plate to prevent it from leaking into the mouth and being swallowed by children with cerebral palsy. Therefore, the aim of this research was to compare the ability of both chlorhexidine and aloe vera to treat plaque in children with cerebral palsy. This is the first research that presented the oral gel in the form of a gel and presented One mouthwash containing both the active ingredients, chlorhexidine and aloe vera, for children with cerebral palsy.

The study sample was selected from children aged between (12-9) years to ensure the presence of emerging incisors and to comply with the recommendations of the American Dental Association (ADA), which stipulates that children should not use mouthwashes under the age of 6 years, for fear of accidentally swallowing a large amount of mouthwash, which leads to side effects. There are many side effects, such as poisoning, vomiting, and nausea, because some products

contain alcohol [8]. The gel was applied in a plate to prevent the gel from leaking into the mouth and causing children to feel unpleasant in terms of taste, and to ensure that the gel remained in contact with the tissues for the required and effective period of time.

the and teeth the clean then, T0 measuring start Then old of presence the out rule to them around tissues .study the of results the affecting plaque control positive a as chosen was Chlorhexidine oral maintaining for standard gold the is it because A [9]. gingivitis and caries preventing and health a on based chosen was %0.012 of concentration two that found which, 2010, al et CUsido by study same the have %0.12 and %0.2 of concentrations lower the that noting, cavity oral the in effectiveness the has and effects side fewer has concentration for chosen was lotion vera Aloe [10]. benefits same at, streptococci especially, activity antibacterial its that noting, concentrations %100-%20-%50 both higher at greater is capacity inhibitory resulting the .remineralize to ability its And [7]. concentrations of contact longer provide to added been has Glycerin moisture maintain and tissues oral with gel oral the for surfactant a is RH 40 Cremophor .surfaces the to .media aqueous in substances oily dissolving sodium and preservative a as benzoate Sodium on Based [19]. .sweetener artificial an as saccharin used substances active the of half-life biological the be to needs substance drug the, research the in x half-life drug) clinically body the from eliminated (10 stimulant immune tissue internal An microorganisms all for antibacterial, interaquinones) .(moisture maintains that polysaccharide a - The half-life of chlorhexidine is 1 hour, so the scanning period is 10 hours. The longer scanning period was adopted and two days were added to completely ensure that the medicinal substances

were eliminated from the body before moving to the other gel ,which ensures blinding of the researcher.

Discussion of the study results:

At time T0 :There is a statistically significant difference in the group of compound gels ,and this can be attributed to random selection ,as the order of the compound gel happened to be the first gel .Thus ,the indicators studied at time T0 improved in the rest of the applied types as a result of increased oral care by families of patients .They were positively influenced by the observations and motivation that the researcher deliberately repeated to the families and patients in every meeting .These differences did not affect the results of the study because we relied on the results of the comparison between T1 and T2 between the effectiveness of each gel applied.

The dental plaque index) PI (score after applying the gel for five days in the group applying the combined gel of aloe vera and chlorhexidine was lower than that in both the aloe vera gel application group and the chlorhexidine gel application group separately , and the dental plaque index) PI (score after applying the gel for five days in The aloe vera gel application group was lower than the chlorhexidine gel application group in the group of children with cerebral palsy in the research sample.

The improvement in gingivitis symptoms in patients with cerebral palsy is attributed to the fact that attention and care for the teeth was sufficient to improve the dental plaque symptoms ,and due to the accumulation of plaque resulting from food remaining in the mouth for a long time resulting from a decrease in the swallowing and chewing reflex [6] ,This led to a decrease in the bleeding symptoms and thus the inflammation feeling .gums .

Therefore ,the application of chlorhexidine gel ,aloe vera gel ,and the combination gel had similar effectiveness in reducing dental plaque ,gingivitis , and gingival bleeding .The decrease in dental plaque in the aloe vera gel group is due to it containing antibacterial substances [19] [7] .The decrease in dental plaque when applying chlorhexidine gel is due to

Conclusions : Within the limitations of this research , we conclude the following :Both chlorhexidine gel and aloe vera gel were effective in reducing dental plaque ,but the compound gel of aloe vera and chlorhexidine was the most effective in its effect on plaque and reducing plaque accumulation in patients with cerebral palsy after use for five years .

Days in sheets Personally manufactured vacuum.

Clinical Case



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