



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2024; 10(2): 253-261
© 2024 IJADS
www.oraljournal.com
Received: 21-01-2024
Accepted: 27-02-2024

Bakir Ghanem Murrad
Department of Dentistry, Kut
University College, Kut, Waist
52001, Iraq

Amjed Fouad Hussein
College of Dentistry, university
of Ahl Al Bayt, Iraq

Reyadh R AL-Rashidi
Department of Dentistry, Kut
University College, Kut, Waist
52001, Iraq

Adipose cell induction under the impacted tooth and extraction facilities (Clinical therapy)

Bakir Ghanem Murrad, Amjed Fouad Hussein and Reyadh R AL-Rashidi

DOI: <https://doi.org/10.22271/oral.2024.v10.i2d.1949>

Abstract

Background: Third molar extraction is one of the most common oral and maxillofacial surgeries. Impaction happens when teeth don't erupt in time. This produces dental arch space and too much soft tissue, a hereditary disease that affects eruption, the length of the dental arch, the amount of space available for emerging teeth, and the placement and size of neighboring teeth may all cause tooth impaction. The aim of this study is to facilitating the difficulties of extraction and bleedings.

Martial and Methods: Case control study of impacted tooth used an adipose cell for injection in the sites of impacted tooth of case group. The case groups injected with adipose cells while the control didn't inject with any cells. Tomography, difficulty of extraction and bleeding tests used for evaluation before and after intervention.

Results: Bleeding degrees in control group were highest than in case groups with significant differences (p. value 0.05). Difficulty of extraction in both groups evaluated and resulted in high levels at the extraction of control group while it was low in case group.

Conclusion: This novel study concluded that the injection of adipose cells under and around impacted tooth led to make the extraction more facilitated and decreasing the bleeding. The formation of adipose tissue after 2 weeks of transplantation reduces the pressure of extraction on the soft tissue of moth and gingiva.

Keywords: Adipocytes, impacted tooth, transplantation, extraction, adipose tissue

Introduction

Third molar extraction is one of the most common oral and maxillofacial surgeries. Impaction happens when teeth don't erupt in time ^[1]. This produces dental arch space and too much soft tissue, a hereditary disease that affects eruption, the length of the dental arch, the amount of space available for emerging teeth, and the placement and size of neighboring teeth may all cause tooth impaction ^[2]. Wisdom teeth may cause impaction, clinical and radiological exams may identify complete and partial impactions. Partial impaction occurs when a tooth is partly visible or connected to the oral cavity but has not completely erupted ^[3]. Total impaction is when a tooth is encased by bone and mucosa and cannot erupt normally. Impacted teeth are this ailment and the maxillary canines and third molars are more prone to become impacted. 72.2% of individuals worldwide have at least one impacted tooth, according to current data (Usually lower third molar). Softer meals and less mastication have led to a rise in impacted teeth in the previous 40 years ^[4]. This is a cross-cultural phenomenon with Inuit's and Latin American natives were considered to be the only tribes without impacted teeth ^[5]. Academics believe race and gender affect the probability of repercussions. Caucasians are more likely to suffer effects than African-Americans, and women are more likely than males ^[6]. Age affects how often people have impacted teeth with most symptomatic impactions are diagnosed in 20s and 30s. Impaction is less common as people become older; it affects 6 to 14% of those over 50 ^[7]. Even while impacted teeth may usually be removed using an elevator and forceps, problems can threaten the patient or surgeon ^[8]. Clinical elements, such as the impacted tooth's location in relation to surrounding teeth, and anatomical features, such as the maxillary sinus, blood vessels, nerves, and anatomic spaces, all affect the advancement of difficulties ^[9]. Even with the best training and knowledge, iatrogenic causes may create problems; knowing the signs can help prevent them ^[10].

Corresponding Author:
Bakir Ghanem Murrad
Department of Dentistry, Kut
University College, Kut, Waist
52001, Iraq

ADSCs, or adipose tissue-derived stem cells, are being studied in regenerative medicine. ADSCs are easy to collect and proliferate quickly. Obesity makes subcutaneous fat easy to access and abundant [11]. Cementoblasts are a subset of osteoblasts due to their morphological similarities with osteoblasts. ADSCs may become osteoblasts under osteogenic environments [12]. If a perfect cementogenic environment is provided, ADSCs may grow along the cementoblast lineage. To generate this ecosystem, embryogenic and morphogenetic processes must be imitated [13]. This creates this setting before cementum is formed, dental follicle cells pass through degrading HERS and touch the root's dentin matrix. Cementoblast origins are unknown [14]. The dental follicle and dentine matrix may include biological mediators needed for cementoblast development. d NCPs consist of glycoproteins/sialoproteins, phosphoproteins, proteoglycans, and growth factors [15]. Dentin non-collagenous proteins make up a large component of the matrix and are required for cementoblast development and cementogenesis [15-17]. The aim of this study is to investigate the clinical role of Adipose cell induction under the impacted tooth and extraction facilities.

Material and methods

Study design: In the trial, there were a total of 20 participants with impacted tooth and distributed in a mean age 35 ± 0.3 of 12 male, female. Ten patients who had impacted teeth leaved as a control group, 10 additional patients who served as a case group and served as the intervention group. The impacted tooth was going to receive an adipose cell transplant in case group. The remaining ten patients which serve as a control group and will not have an adipose cell transplant performed on them. The extraction of teeth surgically will be performed on each patient, and the results of the comparisons will highlight any discrepancies that exist between the patient groups. For the demographical information show (Table 1).

Table 1: Demographical information.

Gender	Group	Age	Number	Percentage
Male	Case	37	6	30%
	Control	38	6	30%
Female	Case	40	4	20%
	Control	43	4	20%
Total		39 ± 0.3	20	100%

Isolation of adipose tissue

After undergoing surgical excision, the whole quantity of adipose tissue from the mouth and fat pads of each patient was collected and evaluated under sterile conditions. Before the tissue was given back to the patient, this step was completed. The decision to perform the procedure on the patient was made after it was determined that the patient had been adequately prepped for the surgery in whatever manner was deemed necessary prior to the operation. The patient's mouth was then placed in a saline solution that had 0.9 percent of salt added to it. In order to facilitate the process of removing the fat pad from the peritoneal region of the abdominal fatty regions. A Petri plate served as the working environment for this technique. This was done to ensure that the procedure would go off without a hitch, and as a result, it was an unavoidable requirement. After that, the blood arteries were cut at the point where they entered the fat pad, the incision was opened up as much as it reasonably could have been, and any blood that was still present inside the body was extracted from it. After that, the blood vessels were sutured

back together. Specimen-based histological slide created with the intent of evaluating adipose tissue for its composition. Each patient was prepared for isolation of fat tissue separately and all samples stored in sterile conditions to use them in the next step of this research. Under hood class 2 the fat tissue washed with alpha mem cultur media and samples used to histology evaluations (Figure 1, 2).



Fig 1: Adipose tissue isolated from patient number 3 of case group

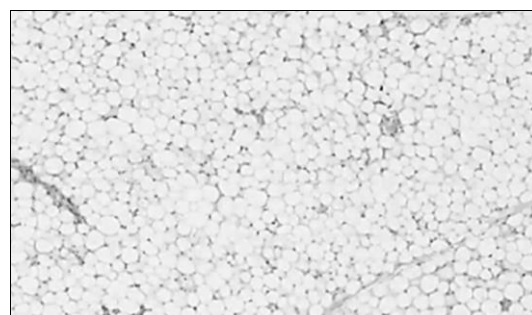


Fig 2: Histology of adipose tissue slides of the sample from patient 2 of case group

Isolation and culture of adipocytes

The cells were cultivated in sterile conditions at a temperature of 37 degrees Celsius in alpha mem in either Leighton tubes or Petri plates, or in bigger tissue culture flasks that were approximately 25 centimeters in size. The temperature was maintained in alpha mem. The culture medium consisted of the following components: freshly acquired human serum added to it at a concentration of 10 percent, 5 mM glucose, 20 Mm/ml insulin, 0.5 (mM) of triolein in a stable emulsion with lecithin, and 0.1 mg/ml of sodium cefalothin, respectively. At the very least, the cultural cultivation media was updated once every two days. This was the absolute minimum. When it was necessary to perform an inspection or take photographic registrations, media that did not contain lipid was used in a temporary capacity as a replacement. This step was in order to prevent any disruptions in the process. In order to eliminate the cells, it was necessary to incubate them for ten minutes at 37 degrees Celsius with 0.125 percent (w/v) trypsin in 0.2 M phosphate buffer. This was done so that the cells could be eliminated. A standard PH level of heparin was received from Sigma, and it was subsequently purchased (Figure 3, 4).

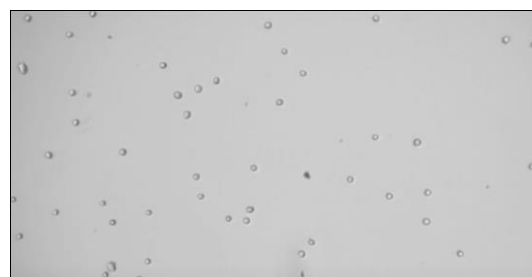


Fig 3: adipocytes cultured in flask 25cm primary culture for evaluation (patient number 5 of case group).

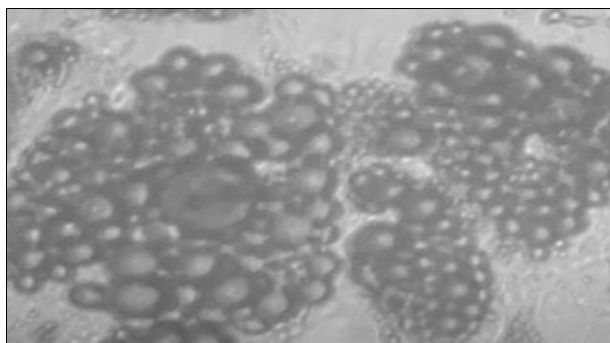


Fig 4: adipocytes cultured in flask 25 cm final culture for treatment (Patient number 6 of case group)

Contamination tests

Microbiological cultures and microscopic inspections were utilized in the testing to ascertain whether or not there was contamination; however, none of the results of the tests came out to be positive. The testing to identify whether or not there was contamination was unsuccessful. The findings of polymerase chain reaction (PCR) tests that were performed on samples collected from the medium and the cells led researchers to conclude that there was no evidence of gram-negative or gram-positive bacteria in the sample. All of these tests yielded results that indicated to the lack of any kind of contamination. The samples were put through tests using fungal cultures, and the findings showed that there was no contamination of any kind in any of them at all. Before the samples were evaluated, antibiotics in a concentration of 1 percent and antifungal agents were administered to each and every sample. The samples were then analyzed.

Tomography

A CT scan was performed on each patient before the therapy with adipose cells could begin. This was done in order to locate the precise location of the impacted tooth. The patient was positioned in a sitting posture and subjected to an X-ray source that was running at 125 kV and 40 mA during the exams for CBCT, which were done using standard equipment (i-CAT, Imaging Sciences International Hatfield, Pennsylvania, United States). Axial sections with a thickness of 0.30 millimeters and intervals of 0.30 millimeters were utilized as the parameter for data collection and 3D reconstruction. These sections were spaced at intervals of 0.30 millimeters. These portions were separated by distances of 0.30 millimeters at regular intervals. The height of the field of vision when it was at its highest point was six centimeters. During the scanning procedure, which took a total of forty seconds, the voxel size, which is what defines the picture resolution, was modified to 0.30 millimeters. This was done so that the image could be scanned at a resolution of 0.40 millimeters.

Induction of adipose cells

After the adipose cells had been grown several times and had successfully passed all of the assessment stages, the cells were separated into groups for storage. This process took place after the cells had successfully passed all of the evaluation phases. Because of this, the cells were able to be kept alive for an extended length of time. After that, the technique of inducing cells was carried out, and 500,000 cells were included in each injection (This step is included only in case group), which was put beneath and surrounding the sick tooth. This step is only included in the case group. It was agreed that injections would be given in three different locations on the

body: frontally, laterally, and below the body.

Tooth extraction

According to the kind of group, there are two different groups of extractions that have been disseminated throughout this research (case and control). The first group had an intervention consisting of the injection of adipose tissue as a means of aiding the removal of impacted teeth. The second set of impacted teeth to be removed, this time without the need for a pre-extraction injection. Throughout the course of this investigation, two distinct groups of extractions have been dispersed, and each of these groups is designated by the kind of group (Case and control). The first group had an intervention that included the injection of adipose tissue as a method of facilitating the extraction of impacted teeth. This intervention was carried out on the first group. The second set of impacted teeth to be extracted, and this time there will not be a need for an injection before each extraction.

Bleeding and difficulty degree of extraction

Every patient who visited the outpatient dental clinics had their treatment while under the influence of local anesthetic, and they were all booked for a following appointment. Inpatients in hospitals made up the great majority of those who took enoxaparin (n = 19–20), accounting for 90 percent of the total. When these individuals were referred for tooth extractions, they were already in the process of receiving treatment with antithrombotic medications. Nevertheless, they were admitted to the hospital for cause's unrelated to dental treatment. It is common practice to provide antithrombotic medications to hospitalized patients. This is done because hospitalized patients have a much higher risk of developing venous thromboembolism (VTE). The diagnosis of postoperative bleeding was based on Lockhart *et al.* with a minor modification in that we defined an event as bleeding that continued for more than 5 hours, bleeding that required the patient to return to a dentist or a medical facility for treatment, bleeding that resulted in a large hematoma or ecchymosis in the oral soft tissues, or bleeding that required a blood transfusion. All of these conditions had to be present for the patient to be considered to have experienced an event. For an event to be regarded to have taken place, it is necessary for each of these conditions to be satisfied. Every single patient was given an appointment for a follow-up appointment. In accordance with our criteria, each patient's dental record was scrutinized in its entirety to determine whether or not there was any indication of postoperative bleeding. Reviewing the medical records of patients who were not seen at the clinic allowed for the determination of whether or not patients who were not seen at the clinic had any follow-up appointments booked at the Emergency Department or at other clinics. Other patients did not have any recorded visits; thus, in order to ascertain whether or not they had any postoperative bleeding, they were questioned over the phone whether or not they had any visits. This was done so that it could be determined whether or not they had any postoperative bleeding.

Data analysis

In this particular research, the data analysis was performed using GraphPad Prism version 9.0 and SPSS version 25; the means and standard deviations served as the markers for p values (0.05). One way a nova tests used for statistically calculations of the study and the differences between the groups of case and control. For continuous variables, baseline

characteristics were reported as the mean standard deviation, and for categorical variables, they were presented as the count (in percentage form). Chi-squared tests were used in order to do research on categorical variables. Every statistical test had two possible outcomes. When P was less than 0.05, statistical significance was assumed. Excel 2010 was used to do the analysis on the collected data.

Results

Adipose tissue after induction

Following an induction period of one to two weeks for the cells, the process of cell development and tissue synthesis had completed all stages and moved on to the next step, which was the preparation of the tooth for extraction. This step was carried out after an induction period of one to two weeks. After an initial period of one to two weeks of induction, this objective was successfully attained. Using the technique of fine needle aspiration, tissue was taken from the site of the induction during the first and second weeks after the procedure. Under a microscope, a histological examination of the tissue might then be carried out as a result of this (Figure 5).

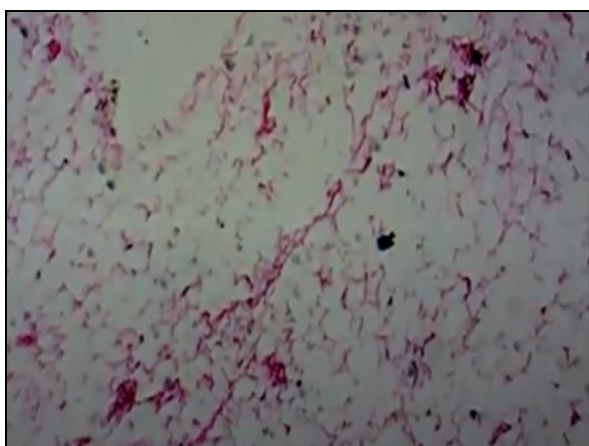


Fig 5: histology of adipose tissue after one week (Patient number 9 of case group).

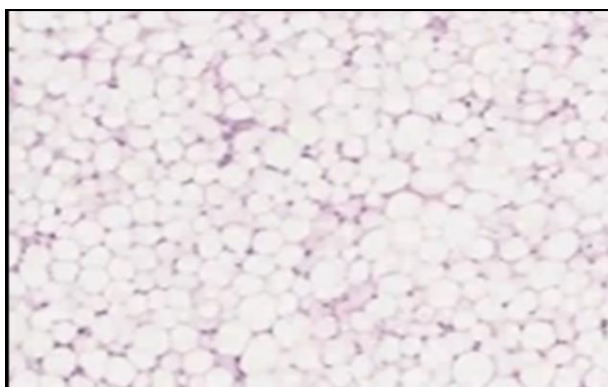


Fig 6: histology of adipose tissue after 2 weeks (Patient number 10 of case group).

Extraction of impacted tooth

The position of the tooth was pinpointed in line with the findings of the topographical screening, and it was thereafter extracted from its socket (Figure 7, 8, 9). At their regularly scheduled appointments, a total of 20 patients, with a mean age of 39 years and 0.3 years, had dental extraction procedures. The average number of teeth taken from each patient was one, and there was no statistically significant difference in the number of teeth extracted from male and

female patients ($p > 0.05$). The patient did not suffer from any of the following medical conditions that necessitated the use of antithrombotic medications: cardiovascular disease, cancer, a history of cerebrovascular accident, the presence of antiphospholipid syndrome, or any other sickness. Before and after the extraction, a comparison was made between the two groups on the degrees of pain and blood loss experienced during the process.



Fig 7: tomography before extraction of the impacted teeth (Patient number 8 of case group)



Fig 8: tomography before extraction of the impacted teeth (Patient number 7 of control group)



Fig 9: tomography before extraction of the impacted teeth (Patient number 8 of control group)

Bleeding and difficulty degree

When establishing which of the four degrees the wound belonged to, one of the elements that was taken into consideration was the amount of blood that was lost (1: 1ml, 2: 2 ml, 3: 3 ml, 4: 4 ml). According to the data that was collected, the number of occurrences of bleeding that took place in the control group was much higher than the number of instances that took place in the case group. The degree of difficulty was divided into two groups based on the amount of movement of the tooth during the extraction operation, which

served as the classifying criteria for the degree of difficulty (Da: low difficulty and Db: high difficulty). The vast majority of people who were a member of Group Da were awarded to

one of the case groups, while the vast majority of people who were a part of Group Db were given roles in the control group (Table 2) and (Figure 10).

Table 2: bleeding degrees and difficulty of extraction according to the groups of study

Group	Number	Bleeding	% in group	Extraction difficulty	% in group
Case	1	1 degree	10%	Da	10%
	2	2 degrees	10%	Db	10%
	3	2 degrees	10%	Da	10%
	4	2 degrees	10%	Da	10%
	5	3 degrees	10%	Da	10%
	6	1 degree	10%	Da	10%
	7	3 degrees	10%	Db	10%
	8	4 degrees	10%	Da	10%
	9	2 degrees	10%	Da	10%
	10	2 degrees	10%	Da	10%
	Total		100%		100%
Control	1	4 degrees	10%	Db	10%
	2	4 degrees	10%	Db	10%
	3	4 degrees	10%	Db	10%
	4	4 degrees	10%	Db	10%
	5	3 degrees	10%	Db	10%
	6	3 degrees	10%	Db	10%
	7	4 degrees	10%	Db	10%
	8	3 degrees	10%	Db	10%
	9	2 degrees	10%	Db	10%
	10	3 degrees	10%	Db	10%
	Total		100%		100%

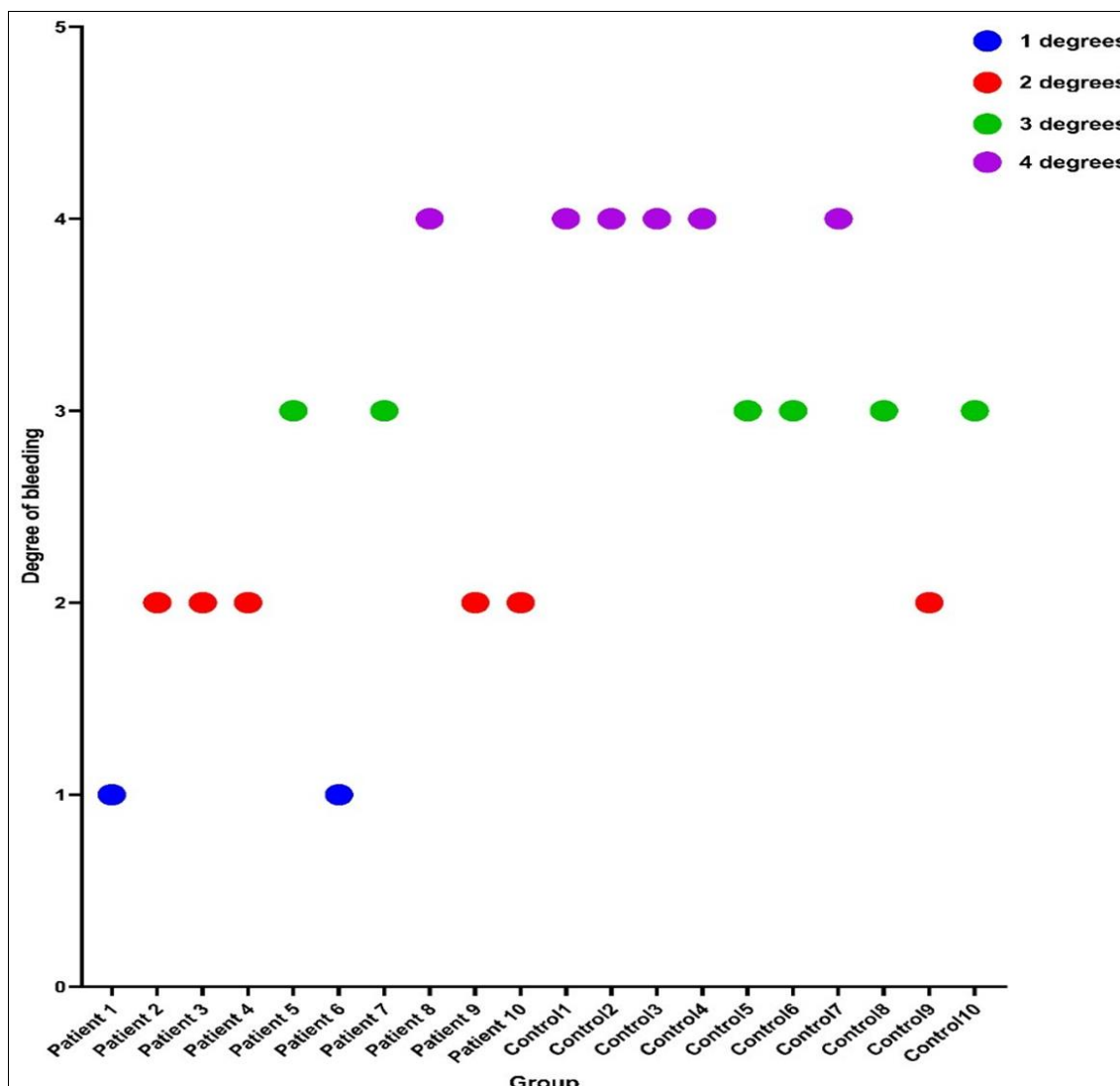


Fig 10: bleeding degrees according to the groups of study

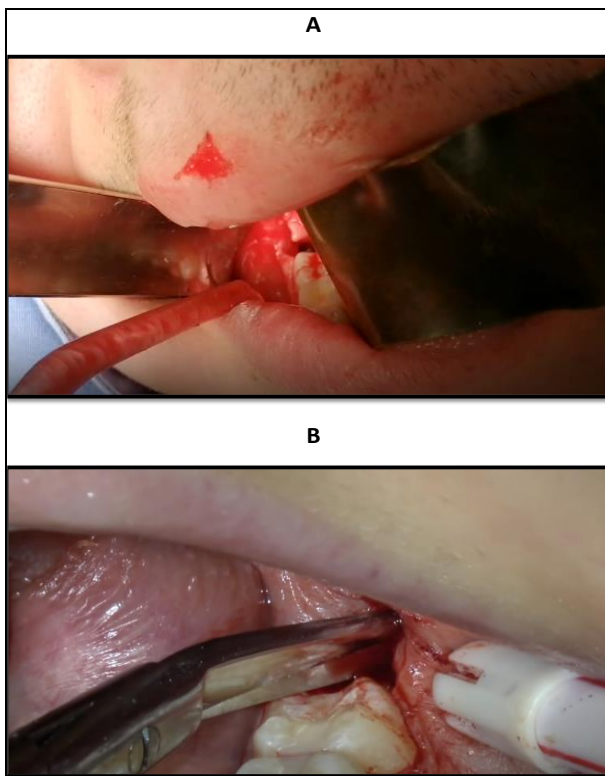


Fig 10: A) bleeding of control study. B) Bleeding degrees according to the groups of study

Discussion

The removal of the third molar is one of the oral and maxillofacial procedures that is performed the most often. When teeth fail to erupt at their normal time, a condition known as impaction may occur. Too much soft tissue is also produced as a result of this process [1, 3]. Tooth impaction can be caused by a number of factors, including the length of the dental arch, the amount of space that is available for teeth that are erupting, as well as the placement and size of teeth that are adjacent to the affected tooth. Impaction is something that may be caused by wisdom teeth, and clinical and radiological tests can detect total and partial impactions [4-6]. Because of the postoperative hemorrhage that occurred as well as the difficulties in extracting processes, a new way for making the process easier has to be developed. Individuals using warfarin had the greatest risk of bleeding, while patients who received adipose transplants had a risk that was almost negligible [7-9]. After the procedure, women have much more bleeding than men, but with the adipose transplantation approach, both sexes experience a same amount of blood loss. In the trial and in the case control group, men and women each made up almost an equal number of patients who had their adipose tissue transplanted [10-12]. In oral anticoagulant bleeding and in adipose transplanted technique, gender differences have been shown to exist, according to a risk factor meta-analysis. Women have a higher risk of bleeding than males do, perhaps due to differences in their body mass index (BMI), creatinine clearance, and anatomic anomalies [13-15]. Women who have been treated with anticoagulants and those who have oral bleeding need more clinical investigation, while the adipose transplantation procedure successfully stops the bleeding. Individuals who had adipose transplants or dental extractions in patients on antithrombotic medications discovered that bleeding is a safer risk than thrombosis [15-17]. In order to alter the dose of the antithrombotic, one required approval from their doctor. Check the patients who have had adipose transplantation before contemplating having minor dental

surgery. Patients who have had adipose transplants have localized bleeding [18-20]. According to the findings of our research, a local adipose transplant was successfully performed on patients within 2 weeks prior to extraction [21-23]. When removing teeth from patients taking anticoagulants, it is imperative that all dentists use local hemostatic agents. Only two individuals on warfarin who had extractions needed a change in their medication. Guidelines from the United Kingdom, Australia, and North America indicate an INR between 2 and 3 or between 2.5 and 3.5 for mechanical heart valves [24-26]. Patients diagnosed with non-valvular atrial fibrillation often get prescriptions for oral anticoagulants as a means of mitigating their risk of developing thromboembolic complications [27-29]. Patients who have had adipose tissue transplanted do not need regular coagulation monitoring or lab-based dose changes; instead, the proper dosage is established by the patient's GFR (GFR) [30-32]. It was shown that quinidine, ketoconazole, HIV protease inhibitors, and erythromycin were not required for the treatment of rivaroxaban in individuals who had adipose tissue transplanted [33-35]. Because of these drugs, the extraction procedure could be more painful and bloody. These adipose transplanted methods have effects that are anticoagulant, and testing is necessary [36-38]. The implanted technique of adipose tissue is there is a range of bleeding risks compared to the control groups. Both surgical tooth extraction (In individuals who have had adipose transplantation) and numerous tooth extractions are procedures that might easily cause bleeding [39-41]. There was no difference in the total number of teeth extracted between patients who were bleeding and those who were not bleeding approach for the transplantation of adipose tissue in minimally invasive oral surgery Dentists have the training and experience necessary to work with patients who have undergone adipose transplantation [42-44]. Dentists encounter a large number of anticoagulant patients in the adipose transplanted patients that they treat who do not need the use of medications [45-47]. Dental care has become more difficult to get as a direct consequence of their being less people utilizing adipose transplanted patients [48, 49]. A recent study found that the majority of oral surgeons stop taking warfarin before conducting low-risk procedures on patients who have received adipose transplants [50-53]. This was the recommendation made by the researchers of the study. Patients who underwent oral surgery did, however, continue to have bleeding after the procedure [26]. As a result of this new knowledge, medical professionals who provide care for patients who have had adipose transplants should adhere to antithrombotic patient dental treatment requirements [36-38]. Because of this, the anticoagulant drug you take may not need to be as strong. In order to provide better care for those who have received organ transplants or adipose tissue, the medical and nursing sectors both need further training as well as fresh ideas [27-29]. This study isn't perfect; for example, there are charts involved, and access to the data is limited [30-32]. A study with a very limited sample size suggests that there is a need for greater research on adipose cells and bleeding. It is possible that a transplanted strategy for adipose tissue will need to be used because to the wide range of educational backgrounds and levels of competence possessed by the dentists performing the extractions [33-35].

Conclusion

The findings of this cutting-edge study showed that injecting adipose cells under and around an impacted tooth made it easier to remove the tooth and reduced the amount of blood

that was lost during the procedure. After two weeks after transplantation, adipose tissue will have formed, which will reduce the strain that the extraction process will have on the gingiva and the soft tissue of the mouth.

Ethical approval

Republic of Iraq
Kut University College

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
جمهورية العراق
كلية الكوت الجامعة

Kut University College
CERTIFICATE OF APPROVAL
RESEARCH ETHICS COMMITTEE

1st Floor, research center, Kut University College, 52001, Wasit, Iraq
Telephone Number: +9647737201363

Date of approval: 5th December 2022
Approval reference number: KUC/1512/2022-042
Research title: Adipose cell induction under the impacted tooth and extraction facilities
Principal investigator: Dr. Bakir Ghanem Murrad
Address of principal investigator: Department of Dentistry, Kut University College, 52001, Wasit, Iraq
DURATION OF RESEARCH: 5th December 2022 – 5th December 2023
CO-INVESTIGATOR(S):
Bakir Ghanem Murrad, Amjed Fouad Hussein and Reyadh R AL-Rashidi
LOCATION OF RESEARCH: Dental outpatient clinics at the Kut University College, Wasit, Iraq.

Prof. Dr. Radhi Kadhum Obaid
Chairman
Research Ethics Committee
Kut University College

Prof. Dr. Radhi Kadhum Obaid
Kut University College

Address: Iraq - Wasit Governorate
Mobile: 07902300291 / 02890000345
Website: www.kutcollege.com
E-mail: rkutcollege@gmail.com
Facebook: facebook.com/alkutcollege
P.O.Box: 46137, Iraq

العنوان: محافظة واسط، مركز كلية الكوت
مختلف بها من نحن وزارة التعليم العالي والبحث العلمي بموجب كتابها
ذوالقعدة (٢٠٢٢) بتاريخ (2023/4/23)

Acknowledgment

I express my sincere gratitude to those whose contributions made this work possible. Special thanks to the head of the department prof. Dr. Hafidh Thiab, head of the dentistry department at the Kut University College, the medical professionals, and follow researchers whose experiences and insights have enriched this work, shedding light on this research.

Conflict of Interest

Not available

Financial Support

Not available

References

- Eisner ER. Surgical tooth extraction in two cases of impacted, abnormally developed teeth. *Journal of Veterinary Dentistry*. 1989;6(1):17-19.
- Cinquini C, Marchionni S, Derchi G, Miccoli M, Gabriele M, Barone A. Non-impacted tooth extractions and antibiotic treatment: A RCT study. *Oral Diseases*. 2021;27(4):1042-1051.
- Lodi G, Azzi L, Varoni EM, Pentenero M, Del Fabbro M, Carrassi A, *et al.* Antibiotics to prevent complications following tooth extractions. *Cochrane Database of Systematic Reviews*, 2021, (2).
- Da'ameh Da. Reasons for permanent tooth extraction in the North of Afghanistan. *Journal of dentistry*. 2006;34(1):48-51.

- Okabe K, Nakagawa K, Yamamoto E. Factors affecting the occurrence of bacteremia associated with tooth extraction. *International journal of oral and maxillofacial surgery*. 1995;24(3):239-42.
- Johanson S, Johanson J. A survey of causes of permanent tooth extractions in South Australia. *Australian dental journal*. 1977;22(4):238-242.
- Sarica İ, Derindağ G, Kurtuldu E, Naralan M, Çağlayan F. A retrospective study: Do all impacted teeth cause pathology? *Nigerian journal of clinical practice*. 2019;22(4):527-533.
- Ye W, Gang N, Tao W, Fu-ping X, Li-song L. Application of virtual, simulation technology in experimental teaching of mandibular impacted tooth extraction. *China Journal of Oral and Maxillofacial Surgery*. 2022;20(3):303.
- Suzuki S, Sugihara N, Kamiyo H, Morita M, Kawato T, Tsuneishi M, *et al.* Reasons for tooth extractions in Japan: the second nationwide survey. *International dental journal*. 2022;72(3):366-372.
- Gao S, Jiang H, Li S. New bone conservation technology of impacted teeth extraction. *Oral Surgery*. 2022;15(2):131-135.
- Zhang X, Wang Y, Shi C, Chen Y, Kang F. Application of three-dimensional visualized model of impacted tooth for surgical extraction in undergraduate oral experimental teaching. *Zhonghua kou Qiang yi xue za zhi = Zhonghua Kouqiang Yixue Zazhi= Chinese Journal of Stomatology*. 2022;57(8):855-60.
- Alassaf MS, Hasubah SM, Sharbib SH, Othman AA, Alsulaimani MA, Qazali AA, *et al.* Assessment of the Relation Between Patterns of Third-Molar Impaction and Blood Group: A Retrospective Study. *Cureus*. 2023, 15(9).
- Borzabadi-Farahani A, editor a scoping review of the efficacy of diode lasers used for minimally invasive exposure of impacted teeth or teeth with delayed eruption. *Photonics*; c2022: MDPI.
- Lei H, Yan W, Song W, Ting Z, Yanni L. Clinical value of cone-beam CT combined with panoramic radiography in impacted mandibular teeth extraction. *分子影像学杂志*. 2022;45(2):194-8.
- Aria SA, Gomes TP, Gutknecht N, Marques MM. Photonics (Er, CR: YSGG and photobiomodulation) versus conventional surgery for impacted lower third molar tooth extraction: A split-mouth, controlled randomized clinical study. *Lasers in Dental Science*. 2022;6(3):169-176.
- Krasny M, Krasny K, Kamiński A. Aesthetic and functional restoration of the dental arch continuity in difficult cases of impacted teeth within the frontal segment. *Cell and Tissue Banking*. 2022;23(2):293-299.
- Zhu F, Hou D, Zhou C, Chen Z, Cao Y, Ji L, *et al.* Precise extraction of impacted supernumerary tooth in the maxillary anterior region with a digital guide plate: A case report. *Medicine*, 2022, 101(20).
- Sato M, Yamana H, Ono S, Ishimaru M, Matsui H, Yasunaga H. Trends in prophylactic antibiotic use for tooth extraction from 2015 to 2018 in Japan: an analysis using a health insurance claims database. *Journal of Infection and Chemotherapy*. 2022;28(4):504-509.
- Gao Z, Gao X, Li J. Effect of SDF-1 Expression in the Healing of Tooth Extraction Wounds in Diabetic Patients. *International Core Journal of Engineering*. 2022;8(3):637-641.

20. Woźniak Ł, Łukaszuk K, Antonowicz B, Szarmach J, Borys J. Conrescent Teeth: Extraction Implications-A Case Report. *The Open Dentistry Journal*, 2022, 16(1).
21. Pinto M, Lee K. Conservative Management of Impacted Teeth: Report of 9 Cases; c2022.
22. Vollmer A, Vollmer M, Lang G, Straub A, Kübler A, Gubik S, *et al.* Performance analysis of supervised machine learning algorithms for automatized radiographical classification of maxillary third molar impaction. *Applied Sciences*. 2022;12(13):6740.
23. Hadler-Olsen S, Steinnes J, Neremo H, Sjögren A, Hadler-Olsen E. Pain, discomfort, and functional impairment after extraction of primary teeth in children with palatally displaced canines—a randomized control trial comparing extraction of the primary canine versus extraction of the primary canine and the primary first molar. *Acta Odontologica Scandinavica*. 2023;81(2):158-163.
24. Konuk B, Şentürk M. Three-Dimensional evaluation of the effect of platelet-rich fibrin on edema in lower impacted third molar surgery performed with piezosurgery. *Nigerian Journal of Clinical Practice*. 2022;25(7):1107-1114.
25. Özüdoğru S, Botsali MS, Şahin O. Management of Treatment Protocols for Missing or Impacted Maxillary Anterior Teeth: A Clinical Case Series.
26. Pinho JNA, Da Mota Santana LA, de Souza LN, Kumar PN, Júnior PA, De Almeida Souza LM. Accidental Intraoperative Mandibular Fracture in a Third Molar Surgery: When Surgical Skills Are Mandatory in the Face of Empiricism. *Case Reports in Dentistry*; c2023.
27. Murata M, Kabir MA, Hirose Y, Ochi M, Okubo N, Akazawa T, *et al.* Histological evidences of autograft of dentin/cementum granules into unhealed socket at 5 months after tooth extraction for implant placement. *Journal of Functional Biomaterials*. 2022;13(2):66.
28. Mouli PC, Kumar SM, Senthil B, Parthiban S, Priya R, Subha R. stem cells in dentistry-A review. *Journal of Pharmaceutical Sciences and Research*. 2012;4(7):1872.
29. Tobita M. Adipose-derived stem cells in dentistry. *Journal of Oral Biosciences*. 2013;55(3):122-126.
30. Davies O, Cooper P, Shelton R, Smith A, Scheven B. A comparison of the *in vitro* mineralization and dentinogenic potential of mesenchymal stem cells derived from adipose tissue, bone marrow and dental pulp. *Journal of bone and mineral metabolism*. 2015;33:371-382.
31. Mead B, Logan A, Berry M, Leadbeater W, Scheven BA. Paracrine-mediated neuroprotection and neuritogenesis of axotomised retinal ganglion cells by human dental pulp stem cells: comparison with human bone marrow and adipose-derived mesenchymal stem cells. *PloS one*. 2014;9(10):e109305.
32. Zuk PA, Zhu M, Mizuno H, Huang J, Futrell JW, Katz AJ, *et al.* Multilineage cells from human adipose tissue: implications for cell-based therapies. *Tissue engineering*. 2001;7(2):211-228.
33. Egusa H, Sonoyama W, Nishimura M, Atsuta I, Akiyama K. Stem cells in dentistry—Part II: Clinical applications. *Journal of prosthodontic research*. 2012;56(4):229-248.
34. Gaur S, Agnihotri R. Application of adipose tissue stem cells in regenerative dentistry: a systematic review. *Journal of International Society of Preventive & Community Dentistry*. 2021;11(3):266.
35. Egusa H, Sonoyama W, Nishimura M, Atsuta I, Akiyama K. Stem cells in dentistry—part I: Stem cell sources. *Journal of prosthodontic research*. 2012;56(3):151-65.
36. Timothy CN, Samyuktha P, Brundha M. Dental pulp stem cells in regenerative medicine—a literature review. *Research Journal of Pharmacy and Technology*. 2019;12(8):4052-6.
37. Chalisserry EP, Nam SY, Park SH, Anil S. Therapeutic potential of dental stem cells. *Journal of tissue engineering*. 2017;8:2041731417702531.
38. Frank CA. Treatment options for impacted teeth. *The Journal of the American Dental Association*. 2000;131(5):623-32.
39. Zhou C, Qian L, Ma H, Yu X, Zhang Y, Qu W, *et al.* Enhancement of amygdalin activated with β -D-glucosidase on HepG2 cells proliferation and apoptosis. *Carbohydrate polymers*. 2012;90(1):516-23.
40. Michael Glode L, Epstein A, Smith CG. Reduced γ -cystathionase protein content in human malignant leukemia cell lines as measured by immunoassay with monoclonal antibody. *Cancer Research*. 1981;41(6):2249-54.
41. Wilson C, Loh H, Foster F. The beneficial effect of vitamin C on the common cold. *European journal of clinical pharmacology*. 1973;6:26-32.
42. Costello L, Franklin R. Prostatic fluid electrolyte composition for the screening of prostate cancer: a potential solution to a major problem. *Prostate cancer and prostatic diseases*. 2009;12(1):17-24.
43. Yuan B, Liu H-Q, Yang Z-R, Chen Y-X, Liu Z-Y, Zhang K, *et al.* Recurrence of positive SARS-CoV-2 viral RNA in recovered COVID-19 patients during medical isolation observation. *Scientific reports*. 2020;10(1):11887.
44. Alsayyad J, Hamadeh R. Cancer incidence among the Bahraini population: a five-year (1998–2002) experience. *Annals of Saudi medicine*. 2007;27(4):251-8.
45. Bhattacharya R, Flora SJ. Cyanide toxicity and its treatment. *Handbook of toxicology of chemical warfare agents*: Elsevier; 2009. p. 255-70.
46. Newton GW, Schmidt ES, Lewis JP, Lawrence R, Conn E. Amygdalin toxicity studies in rats predict chronic cyanide poisoning in humans. *Western Journal of Medicine*. 1981;134(2):97.
47. Bhalla TC, Prashant, Kumari N, Kumar V, Kumar V, Savitri f. Synthesis of vanillic acid using whole cell nitrilase of wild and mutant *Gordonia terrae*. *Bioprocess and biosystems engineering*. 2016;39:67-73.
48. Schieman C, Rudmik LR, Dixon E, Sutherland F, Bathe OF. Complementary and alternative medicine use among general surgery, hepatobiliary surgery and surgical oncology patients. *Canadian Journal of Surgery*. 2009;52(5):422.
49. Karlsson FH, Ussery DW, Nielsen J, Nookaew I. A closer look at bacteroides: phylogenetic relationship and genomic implications of a life in the human gut. *Microbial ecology*. 2011;61:473-85.
50. Alwan AM, Afzaljavan F, Tavakol Afshari J, Homaei Shandiz F, Barati Bagherabad M, Vahednia E, *et al.* The impact of CYP19A1 variants and haplotypes on breast cancer risk, clinicopathological features and prognosis. *Molecular genetics & genomic medicine*. 2021;9(7):e1705.
51. Alwan M, Afzaljavan F. Significance of the Estrogen Hormone and Single Nucleotide Polymorphisms in the Progression of Breast Cancer among Female. *Archives of Razi Institute*. 2022;77(3):943.
52. Alwan AM, Afshari JT. Investigating the Protective Role

of Rhodanese Enzyme against Cyanide, the cytotoxic by-product of Amygdalin, in HDF and L929 Cell Lines. *Letters in Drug Design & Discovery*. 2023;20(9):1295-307.

53. Alwan AM, Afshari JT. *In vivo* Growth Inhibition of Human Caucasian Prostate Adenocarcinoma in Nude Mice Induced by Amygdalin with Metabolic Enzyme Combinations. *BioMed Research International*. 2022;2022.

How to Cite This Article

Murad BG, Hussein AF, AL-Rashidi RR. Adipose cell induction under the impacted tooth and extraction facilities (Clinical therapy). *International Journal of Applied Dental Sciences* 2024; 10(2): 253-261.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.