.The use of portable dental units in Iraq has the potential to contribute to improving oral health outcomes among children and adults.4.2 Future work: This PDU has to be used in the field for a while to identify issues and gaps that may be faced to be improved and add additional components if needed 1.3.3 Literature Review: There were many scientific researches that dealt with different designs and applications of portable dental unit as well as The use of portable dental units has been shown to improve oral health outcomes in various populations and countries While there is no specific mention of Iraq in research studies which mean there is no project implementation of past designed portable dental unit by Iraqi engineers, by using analysis methods on most of designed PDU we have found that the high cost which was exceeds 1500$ as well as adding more components which are not considered under the main components that affect the basic work of PDU like (build in air compressor, electricity power-ray and sucker system which include drain system ,and other assistant components as shown in dental chair function diagram Fig.1 etc.) 9 , and that will add more weight and size as well as may lead to limitations of having it in most mentioned situations mentioned above .ii [2]the association between depression and oral diseases and self-reported symptoms of depression individuals was determined by linear regression analysis, which highlighted the importance of maintaining oral health as part of the general psychological wellbeing of the population, and indicated that increased esthetic level of teeth/gingiva significantly decreased the feeling of depression.Economical Study 4 1.3.5 PDU Project timeline The time plan views the stages of establishing the project with its components, by using Gannt Chart analysis method 4.1 Conclusion: Although the challenging problems faced during the implementation process of this project which are finding high quality materials in low cost and minimizing size of the PDU by removing other components as much as possible, we successfully designed a reliable/safe/lightest weigh with low cost portable dental unit.In addition; this project acts an important task in the modern hospitals, because some children and patients refuse or not able to be treated in the clinic, so they are forced to be treated under sterilization in the operating room allows clinicians to provide dental care on-site to patients who are unable to travel to a traditional dental clinic , This is particularly important for vulnerable groups such as internally displaced children (IDC) who have limited access to dental services .The inaccessibility of prevention and treatment services directly impacts the treatment options and costs for IDC ,by bringing dental care directly to these populations, portable dental units can help address their oral health needs and improve their gingival health.A portable outreach oral hygiene program for people with 7 disabilities attending daytime centers for disabled (DCD) in Italy demonstrated a clear improvement in periodontal health and increased compliance with oral hygiene sessions.The unit is also equipped with a water tank, allowing for the provision of continuous water supply for washing purposes, it include 3 systems (water system, air system and suction system) which are essential in catering to the basic oral health needs of underserved patients in unique settings such as emergency care, Ural areas, and in dental clinics.Portable and mobile dentistry (PMD) has historically been valuable in bridging the access gap for vulnerable populations, such as children and the elderly, and could also benefit large employers by allowing employees to receive dental care with minimal disruption to their workday.As the dental chair is relatively expensive, and it needs a special clinic with special specifications like site, light, dimensions, conditioning, and other circumstances, the idea of

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designing a portable dental unit is occurred, especially in critical situations like mentioned situation, it aims to reduce both patient's and doctor's time, with less effort from dentist, since it can be moved, carried, repaired and viii ix x constructed easily.Take in consideration other emergency situation that may affect the work of dentist 8 even in common situation while he is dealing with patients when main dental unit(dental chair unit) gets failure ,so the dentist can employ this PDU which are essential in catering to the basic oral health needs of underserved patients in those unique settings ,This design aims to reduce both patient's and doctor's time, with less effort from dentist, since it can be moved, carried, repaired and constructed easily.By bringing dental care directly to the population in villages, the portable unit can assist dentists in providing necessary dental care to individuals who may otherwise not have access to it, thereby improving oral health outcomes in Iraq.Additionally, a protocol at a children's hospital in Italy successfully provided oral care for hospitalized patients with special needs using portable dental units, highlighting the feasibility of dental procedures at patients' bedside.Built- out air compressor to ensure a light weight and small size, sucker system hasn't been included, to ensure patient comfort and safety it includes essential dental equipment and instruments within a portable casing, allowing for easy transportation and setup.While there is no specific mention of Iraq in research studies , the use of portable dental units has shown promise in improving oral health outcomes in various populations, suggesting that it could potentially contribute to improving oral health outcomes among children and adults in Iraq as well.Conclusions Results indicated that oral diseases, particularly those adversely affecting function and esthetics, were associated with symptoms of depression in Iraqi individuals.These findings highlighted the importance of maintaining oral health as part of the general psychological wellbeing of portable dental care unit can be utilized.The portable dental care unit described in 6 vi [6] .comprises movable structural elements that can be arranged in a compact state for easy transportation.1.3 Project Importance 1.3.1 Problem to be solved Due to research studies that were mentioned above, the most prevalent dental problems faced by the Iraqi population include caries, missing teeth, gingival bleeding, gingival recession, teeth mobility, and dry mouth those come due to limit access to dental clinic.Oral diseases positively associated with depression were caries, missing teeth, gingival bleeding, gingival recession, teeth mobility, and dry mouth (R2 = .155).The male to female percentage was 38.2 %, 61.8% respectively and the highest number of extractions was observed in females in rural areas most of the patients are a housewife.It consisted of two main sections; the first section was dedicated to collect demographic variables and self-reported symptoms of oral diseases.Additionally, the use of portable dental units can also be beneficial in promoting oral health and reducing smoking rates.It is equipped with a high-speed headpiece, low-speed headpiece, and an air-water syringe, ensuring that all necessary dental procedures can be performed seamlessly.10 The headpieces are designed to provide precise control and optimal functionality, enabling efficient dental treatments.The use of portable dental units in Iraq has the potential to contribute to improving oral health outcomes among children and adults.In this cross- sectional examination overall 1257 patients were treated in the teaching clinic of the oral and maxillofacial surgery department, College of Dentistry, the University of Basrah between 2018-2021.A significant difference between education and dental extraction was noted between urban and rural areas.The largest proportion considered as the main

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cause of extraction was dental caries consequences of 80.5% and the lowest 16.9% from periodontal disease.In the last decades, evidence linking increased expression of depression and oral diseases/conditions has significantly increased.The aim of this study is to assess the association between oral disease/conditions and self-reported symptoms of depression individuals.The second section, Patient Health Questionnaire-9 (PHQ-9), was used to assess the severity of depression via nine questions using a 4-point Likert scale.The majority of participants, about 60%, showed mild to moderate symptoms of depression, while 8.9% expressed severe symptoms.In contrast, increased esthetic level of teeth/gingiva significantly decreased the feeling of depression.This portable unit can help make dental care more accessible to all vii people, including those in rural areas without access to dental practices [7].The use of portable dental units has been shown to improve oral health outcomes in various populations.Furthermore, a portable dental care unit has been developed to make dental care available to all people equally, including those in rural areas without access to dental practices.As the dental chair is relatively expensive, and it needs a special clinic with special specifications like site, light, dimensions, conditioning, and other circumstances, the idea of designing a portable dental unit is occurred, especially in critical situations.Our PDU improvements include: Basic PDU that offer flexibility and convenience due to light weight and design simplification which is machines, not electricity powered, but air powered.Most studies confirmed caries are the main cause of tooth extraction in urban and rural areas, especially in young people.The comparisons include age, gender, educational level, occupation, chief complaint, diagnosis, and tooth site.Aims The negative impact of oral diseases on the function, economy, and general health of 5 the population is well-documented.Association between depression and oral disease was determined by linear regression analysis.so our project has design can do the main functions of a dental unit, which includes the function of high speed turbine, low speed turbine, and triple syringe as well as water supply unit.As medical books and resources give only rough idea about the dental chair, this project aims to support the medical instruments engineering discipline in the university with a complete documentation about the dental unit.Hence, providing the students with a valuable knowledge gained from advanced training courses and experts.The numbers of tooth extraction in urban and rural were very close 632(50.3%) and 624(49.7%) extractions respectively.Methods A specially designed questionnaire was distributed via social media for 1 week.Results A total of 1975 participants responded fully to the questionnaire and were included in the final analysis.In addition; this project acts an important task in the modern hospitals, like PWD and may some children and patients refuse or not able to be treated in the clinic, so they are forced to be treated under sterilization in the operating room.In other hand, by minimizing dental unit components, efforts, system cost will be minimized.We hope our work gets implemented in the field and get advantages of PDU project improvements that have already implemented by mentioned team work engineers.There is a relationship between the level of education and dental extraction, particularly in rural areas.Tooth extraction has seen more in the third, fourth and fifth decade than other age groups 20.4%, 22%, 19.9% respectively.It also includes a compartment for housing dental equipment.Take in considerations that sucker system "sucker and drain station " haven't been included in our project to meet the main objective of our project which make it simple, light, easy to handle.But teeth going to be affected by diseases, bacteria and

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rot.reasons and pattern of tooth loss were recorded and data were computed on SPSS.So this project concerns in people who need health teeth by a modern technology using a portable dental unit.Data were collected from patients' data after taking the agreement of the ethical committee in the college.The main complaint was for prosthetic therapy 45.3% and 43.2% because of pain.The best feature of this design that it can be used in any place, either inside or outside of the clinic, like open days, also in critical circumstances, like wars, emergency and other conditions.The best feature of this design that it can be used in any place, either inside or outside of the clinic, like open days, also in critical circumstances, like wars, emergency and other conditions.1.3.2 Project Aim.Version 20.[8,9,10].

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