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Human dental pulp stem cells (hDPSCs) as treatment for periodontal disease

Submission date	Recruitment status	[_] Prospectively registered
06/06/2016	No longer recruiting	[_] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
10/07/2016	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
06/10/2022	Oral Health	

Plain English summary of protocol

Background and study aims
Periodontitis, or periodontal disease (PD) is a very common chronic gum infection that damages the soft tissue and destroys the bone supporting the teeth. It can lead to tooth loss, difficulties chewing, poor appearance of teeth and gums and it can even increase the risk of a heart attack or stroke. It is caused by the build-up of bacteria in the mouth which, over time, combines with saliva and small food particles to form a sticky film over the teeth, called plaque. The bacteria in the plaque can result in gum disease, leading to swollen, painful gums. If not treated, this gum disease will get worse and will develop into periodontitis. Up to 90% of people over the age of 75 have PD and it carries with it a high risk of other health complications. Current treatments are not very effective. Experimental and clinical data suggest that human dental pulp stem cells (hDPSCs) are capable of regenerating periodontal structures (soft tissues and bone supporting the teeth) regardless of their autologous (coming from the person themselves) or allogeneic origin (coming from a donor). This study is looking at the effect of in situ treatment with hDPSCs on periodontal disease, markers of oxidative stress and inflammation in aging adults.

Who can participate?
Adults aged 45-64 with PD.

What does the study involve?
All participants have an initial oral clinical assessment to measure the extent of their PD. They also have blood samples taken from biochemical tests, blood count and coagulation (blood clotting) tests. Saliva samples are taken in order to see whether there is any evidence of oxidative stress or chronic inflammation. The participants all have conventional dental treatment to remove tartar and clean the surfaces of the teeth. They are given mouthwashes to use every 12 hours for the next 15 days. The participants are now randomly allocated to one of two groups. Those in group 1 undergo surgery to place a scaffolding (supporting network) of collagen in the mouth. Those in group 2 are undergo surgery to place a scaffold of collagen in the month with hDPSCs. All participants are then followed up at 3, 6 and 12 months to see whether their PD has improved.

What are the possible benefits and risks of participating?
The possible benefits of participating are tissue regeneration of the tooth, reduced tooth

mobility (tooth loosening) and the preservation of teeth that would otherwise be in danger of being lost prematurely. Periodontal surgery, cells and tests have no cost and the results of the review will be explained to the dental patient for control and monitoring of their health status. Regarding the risks, there seems no evidence of toxicity or immediate or delayed side effects. Potential risks are no different to those of a standard dental procedure. Periodontal surgery will be performed by qualified personnel, with new, disposable material. The cells to be placed will be provided by the Bank of Umbilical where they were previously conducted tests to confirm they are free of infectious agents.

Where is the study run from?
National Autonomous University of Mexico ,Gerontology Research Unit, Faculty of Zaragoza Higher Studies (Mexico)

When is the study starting and how long is it expected to run for?
April 2016 to June 2018

Who is funding the study?
National Autonomous University of Mexico

Who is the main contact?
Dr Victor Manuel Mendoza--Nuñez

Study website
http://www.zaragoza.unam.mx/

Contact information

Type(s)
Scientific

Contact name
Dr Víctor Manuel Mendoza-Nuñez

ORCID ID
http://orcid.org/0000-0002-9137-3405

Contact details
Guelatao # 66
Colonia Ejercito de Oriente
Delegación Iztapalapa
Mexico
D.F.
09230
Mexico
Mexico
Mexico
09230

Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
CTPPDAJG-1

Study information

Scientific Title
Effect of human dental pulp stem cells (hDPSCs) on periodontal disease in adults in ageing process and its relation to markers of oxidative stress and inflammation

Study objectives
The scientific evidence about the possible use of topical application of stem cells to periodontal regeneration, leads us to assume that patients with periodontal disease who receive treatment in situ of Human Dental pulp stem cells (hDPSCs) will have clinical improvement linked to an observable effect on antioxidant and anti-inflammatory markers measured in saliva.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Bioethics and Biosafety Committee of the Research Committee of “Facultad de Estudios Superiores Zaragoza, UNAM”, ref: 25/11/SO/3.4.1

Study design
Single centre randomised controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Other

Study type(s)
Treatment

Participant information sheet
No participant information sheet available

Health condition(s) or problem(s) studied
A deep infrabony defect ≥ 4 mm deep caused by periodontal disease

Interventions

All patients will be enrolled in a strict nonsurgical periodontal program that included systemic antibiotic therapy, careful instructions on proper oral hygiene measures and subgingival scaling and root planing with an ultrasonic instrument. Subgingival instrumentation will be completed without a time limit until the root surface felt smooth and clean to an explorer tip. Furthermore, the patient will be verbally informed and signed a consent form.

Clinical assessments, including probing depth, gingival recession, and attachment loss, will be measured on all patients. Furthermore, Cone-Beam Computed Tomography, radiography and intraoral photographs will be taken to determine the intensity of bone destruction. Also as part of the baseline analysis, biochemical analysis, blood count and coagulation tests will performed. Moreover, fasting saliva samples will be taken to assess markers of oxidative stress and chronic inflammatory process and consider them as biochemical markers of clinical improvement.

Phase 1. surgery:
conventional treatment:
Prophylactic deep curette or ultrasound will taken in order to remove all dental tartar and leave the surface clean. Mouthwashes with 15 mL of 2% clorehexidine every 12 hours for 15 days. Then, subjects will be divided into two randomly assigned groups:

1. Collagen scaffold group: periodontal surgery will be performed to place a scaffolding of collagen
2. hDPSC treatment group: periodontal surgery will be performed to place a scaffolding of collagen with hDPSC

Phase 2. post surgery evaluations:
Fasting saliva samples will be taken to assess markers of oxidative stress (lipid peroxides, SOD, AOX) and chronic inflammatory process (TNF-α, IL1-β, IL-6, IL-8, IL-10 and IL-12p70) and consider them as biochemical markers of clinical improvement. Cone-Beam Computed Tomography, rX and intraoral photographs to determine bone regeneration.

Intervention Type
Procedure/Surgery

Primary outcome measure
1. Probing depth, gingival recession, and attachment loss via clinical assessments at post-surgery follow-up (3, 6 and 12 months after Phase 1)
2. Evolution of periodontal disease and bone regeneration via Cone-Beam Computed Tomography, radiography and intraoral photographs at post-surgery follow-up (3, 6 and 12 months after Phase 1)

Secondary outcome measures
1. Concentration of oxidative stress and chronic inflammatory markers by TBARS assay, Total Antioxidant Status, superoxide dismutase activity and quantification of cytokines at post-surgery follow-up (3, 6 and 12 months after Phase 1)
2. Regeneration of bone tissue, via changes in bone density via Cone-Beam Computed Tomography at 3, 6 and 12 months after Phase 1
3. Mobility of teeth, tested clinically by a specialist at 3, 6 and 12 months after Phase 1

Overall study start date
01/04/2016

Completion date
30/06/2018

Eligibility

Key inclusion criteria
1. Patients 45 to 64 years old
2. Have atraumatic occlusion but vertical bone defect maximum two walls affected and loss of adhesión
3. ≥ 4 mm deep, controlled chronic degenerative disease
4. Good nutritional status
5. Manually skilled and ability to follow instructions
6. Able to give informed consent

Participant type(s)
Patient

Age group
Adult

Sex
Both

Target number of participants
40

Key exclusion criteria
1. Smoking
2. People who have taken antioxidant supplements or anti-inflammatories in the last 6 months
3. Family history of osteoporosis
4. Family history of cancer

Date of first enrolment
04/06/2016

Date of final enrolment
31/03/2017

Locations

Countries of recruitment
Mexico

Study participating centre
Gerontology Research Unit, FES Zaragoza (Unidad de Investigación en Gerontología, FES Zaragoza, UNAM)
J.C. Bonilla 66, Ejercito de Oriente, Delegación Iztapalapa,
México

Mexico
09230

Sponsor information

Organisation
National Autonomous University of Mexico [UNAM] (Mexico)

Sponsor details
J.C. Bonilla 66, Ejercito de Oriente, Delegación Iztapalapa,
Mexico
Mexico
09230
56230721
mendovic@servidor.unam.mx

Sponsor type
University/education

Website
http://www.zaragoza.unam.mx/

ROR
https://ror.org/01tmp8f25

Funder(s)

Funder type
University/education

Funder Name
National Autonomous University of Mexico

Results and Publications

Publication and dissemination plan
Publish an article which shows that the hDPSC induce clinical improvement in patients with periodontal disease.

Intention to publish date
30/06/2019

Individual participant data (IPD) sharing plan
Not provided at time of registration

IPD sharing plan summary
Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other publications	case report	01/07/2018	30/11/2020	Yes	No
Results article		18/08/2020	06/10/2022	Yes	No