STEM CELL THERAPY: WHAT IRS SHOULD KNOW?

Prof.Hossein Ghanaati
Dr.Maedeh Rouzbahani
Tehran University of medical Sciences

Introduction:

DO YOU KNOW ANY KIND OF MEDICATION TO DO THESE ALL AT THE SAME TIME?

REGENERATION EFFECT — Which can even create an ear!

ANTI INFLAMMATORY EFFECT — Same as cortons!

IMMUNOMODULATORY EFFECT — Same as Infliximab, Azathioprine, and others

Introduction:

DO YOU KNOW ANY KIND OF MEDICATION TO DO THESE ALL AT THE SAME TIME?

Regeneration:

< Home

CTV NEWS

HEALTH

5 Chinese children get new ears grown from own cells

CTVNews.ca Staff

Published Tuesday, January 30, 2018 8:10PM EST

London scientists grow noses and ears

April 8, 2014 / 11:05 AM EDT / CBS News

MATT DUNHAM/AP

Introduction:

What are stem cells?

-Stem cells are a category of cells naturally present in our bodies, playing a role in partial body repairs and other bodily activities. Various sources of stem cells exist in our bodies, including bone marrow cells, fat cells, cells in the gums, muscle cells, and umbilical cord cells, including Wharton's jelly and umbilical cord blood.

Anti inflammatory effect

al of Inflammation Research

An Inflammatory disease

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Open Access Full Text Article

REVIEW

Stem Cell Therapy in Inflammatory Bowel Disease: A Review of Achievements and Challenges

infliximab

Cheng-Mei Tian[1,2,*], Yuan Zhang[3,*], Mei-Feng Yang[4,*], Hao-Ming Xu[5], Min-Zheng Zhu[6], Jun Yao[1], Li-Sheng Wang[1], Yu-Jie Liang[7], De-Feng Li[1]

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*These authors contributed equally to this work

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Immunomodulatory effect:

Auto immune disease

RENAL FAILURE
2021, VOL. 43, NO. 1, 1266–1275
https://doi.org/10.1080/0886022X.2021.1968432

Taylor & Francis
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CLINICAL STUDY

OPEN ACCESS Check for updates

Autologous bone marrow-derived mesenchymal stem cells for interstitial fibrosis and tubular atrophy: a pilot study

Lei Zhang, Xingqiang Lai, Yuhe Guo, Junjie Ma, Jiali Fang, Guanghui Li, Lu Xu, Wei Yin and Zheng Chen

Department of Organ Transplantation, The Second Affiliated Hospital of Guangzhou Medical University/The Second Clinical Medicine School of Guangzhou Medical University, Guangzhou, China

cortons

Why is stem cell therapy important in (IR)?

Radiologists are the eyes of all other specialists.

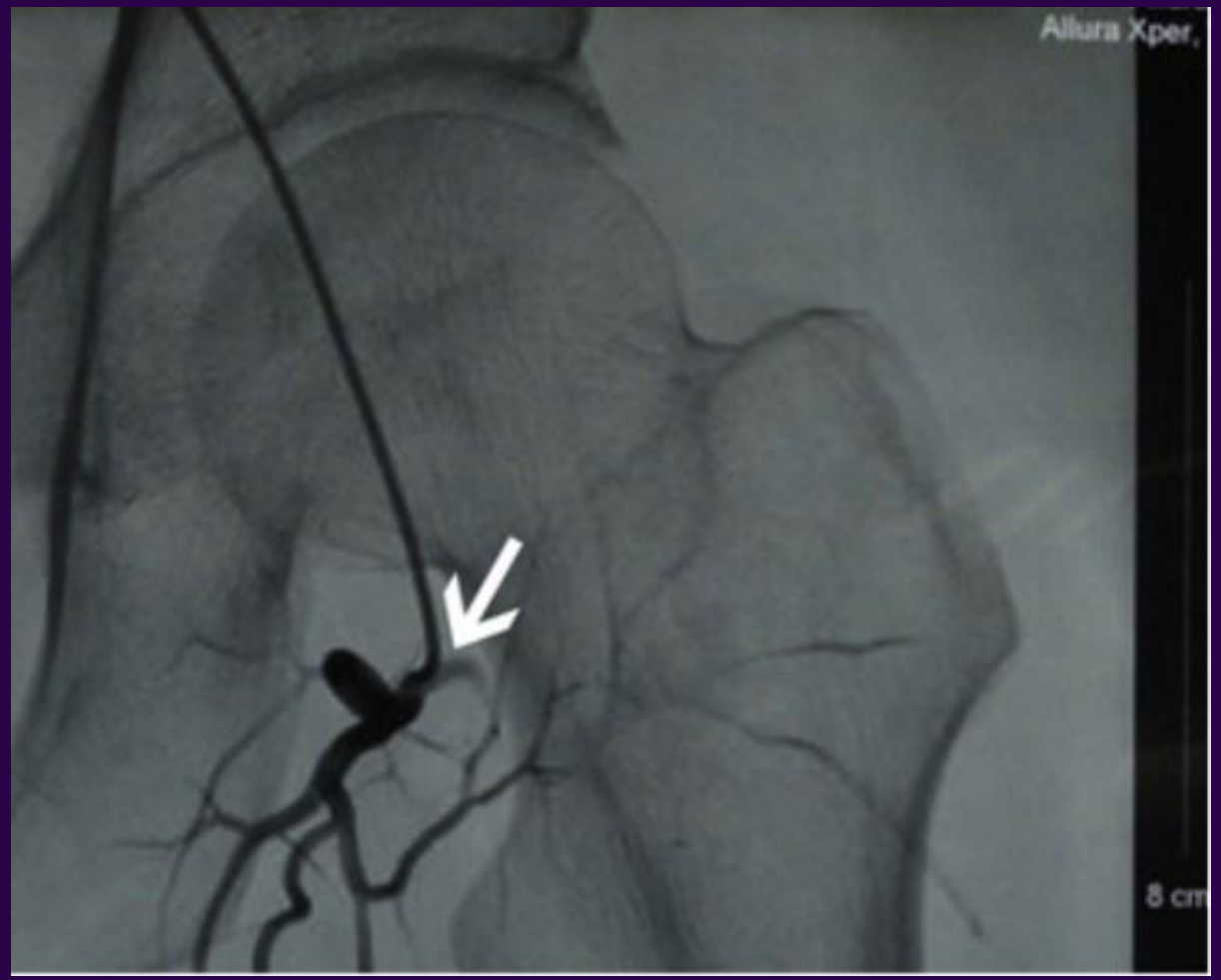
Stem cells play a crucial and potentially transformative role in medicine. Therefore, radiologists must have clear vision to facilitate targeted and personalized drug delivery.

Evidence suggests that while systemic stem cell therapy may not be effective, targeted injections of cells are more promising.

Vascular delivery is often the most effective form of targeted therapy.


STEM CELL
CATHETER
STELL
DISEASE
Interventional radiologist

Head of femur



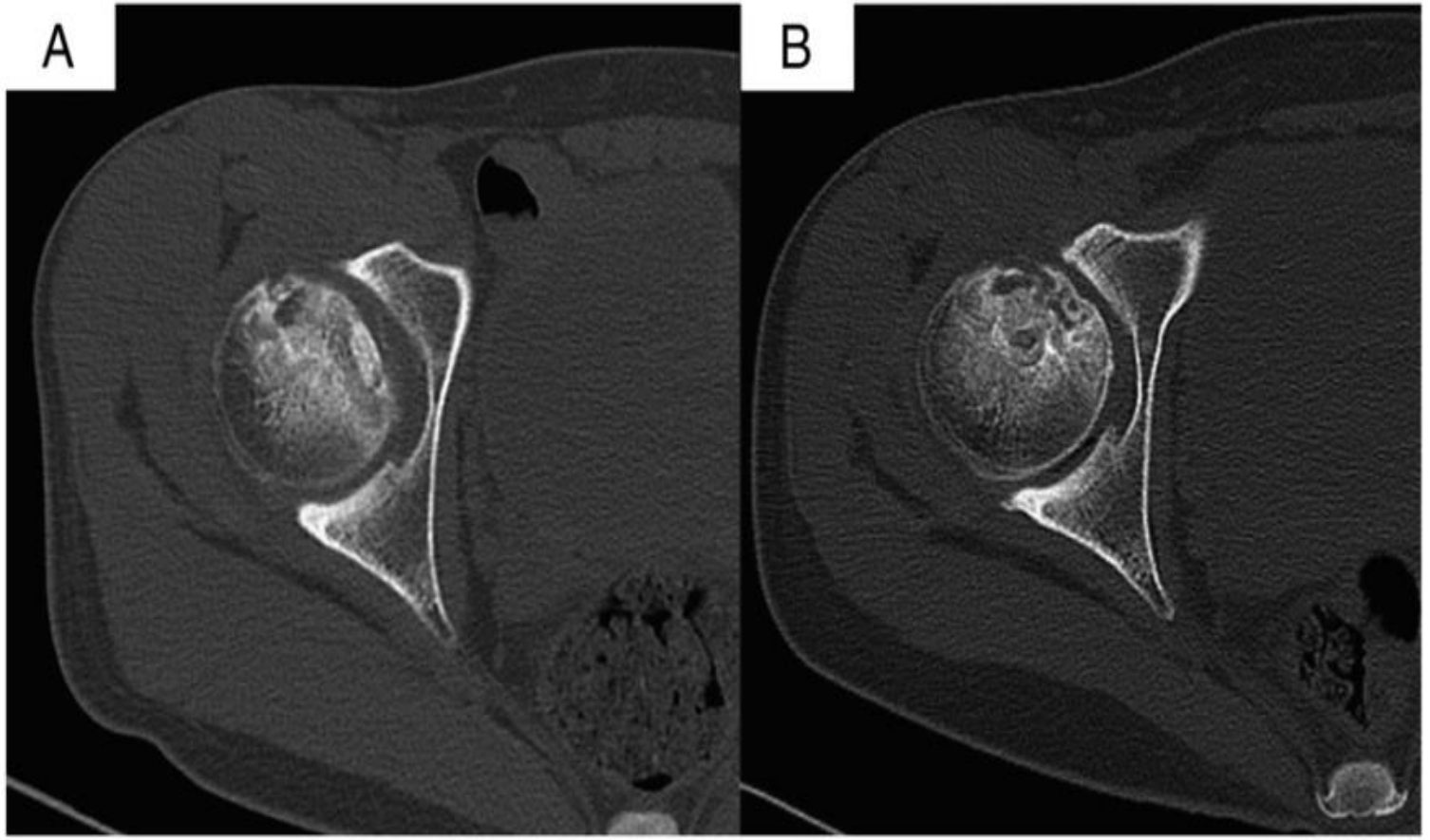


Fig. 7. CT scans at12 months after treatment show healing in necrotic region of femoral head, and the femoral head remains intact and round. (A) was obtained before the treatment, (B) was obtained at 12 months after the treatment.

Introduction:

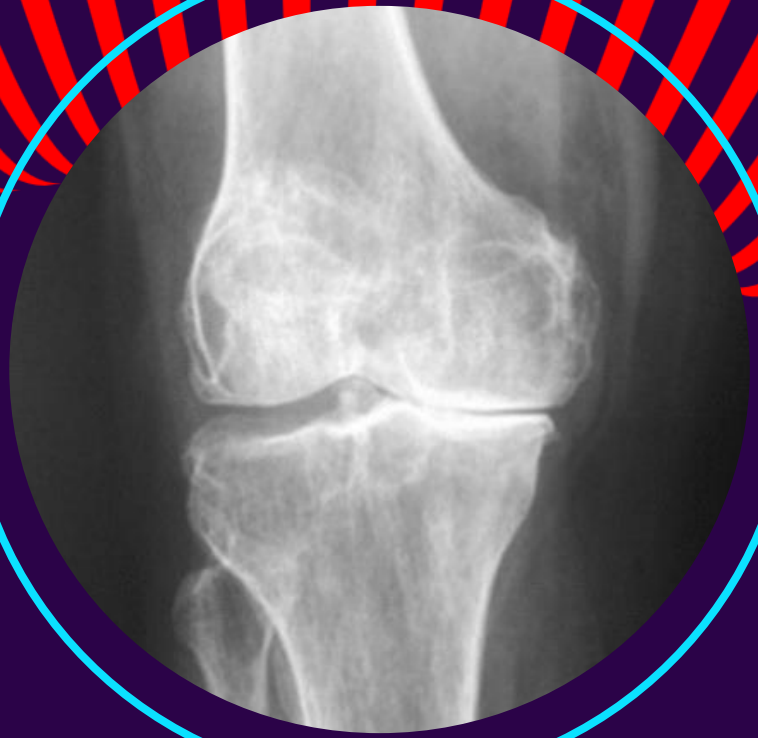
ABOUT KNEE OA

-Osteoarthritis disease (OA) , is one of the most common joint destructive diseases, which can progress slowly and cause irreparable damage

-6% of men and 18% of women, who are under the age of 60 are suffering from OA all over the world

-No definite cure for this disease has been known so far

-In OA, the most common treatment is medical therapy for pain control



Stem cell preparation

Umbilical cord (UC) is a rich source of rapidly proliferating mesenchymal stem cells (MSCs) that are easily cultured on a large-scale.

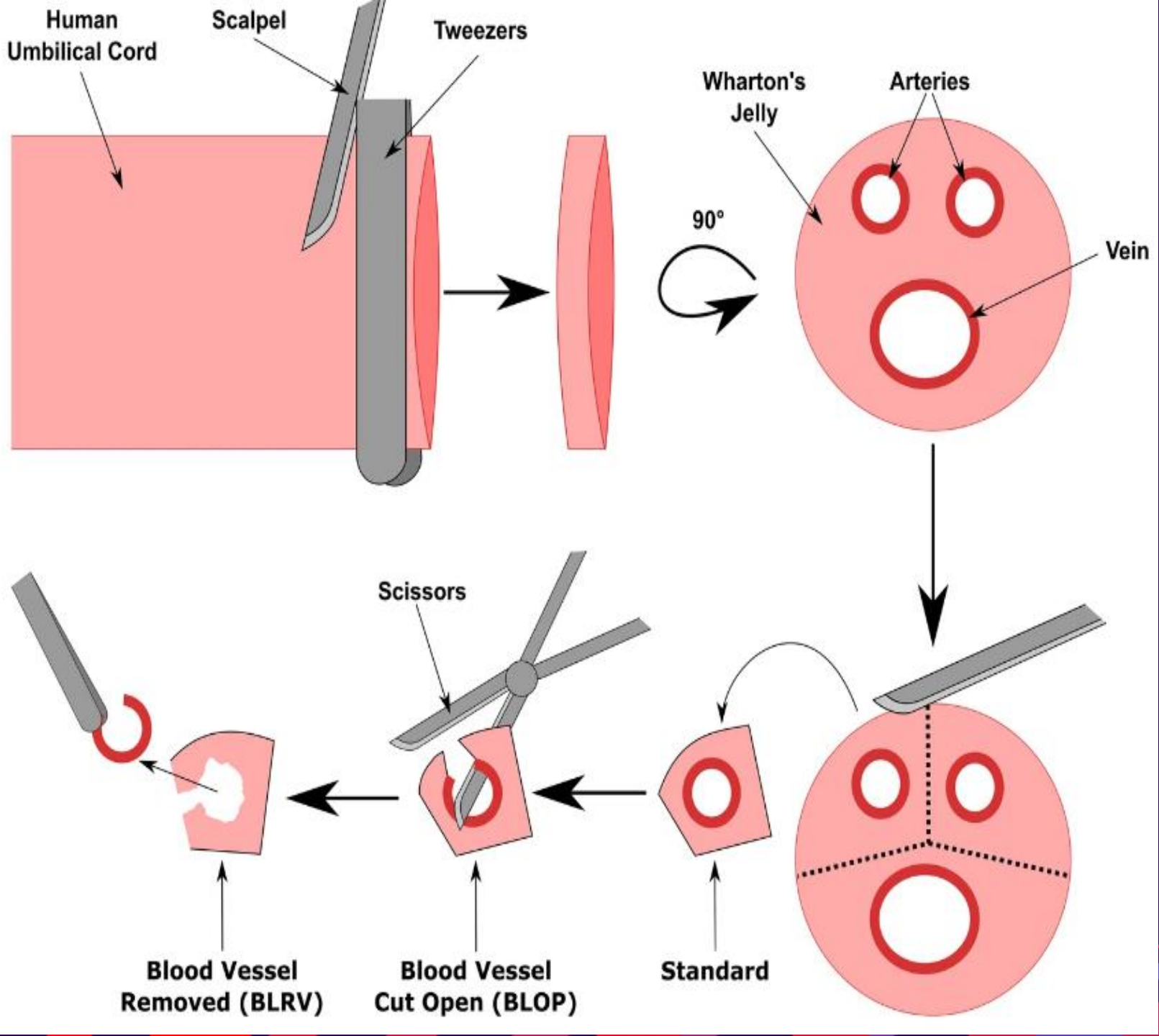
Schematic description for human umbilical cord preparation to improve the transduction of MSC-EM-initiating cells.

Tweezers (4 mm) were used to generate uniform slices by transversal dissection of the umbilical cord with a scalpel.

In the second step, the slices were cut between the blood vessels to ensure one blood vessel in each of three pieces (Standard).

One blade of the scissors was pushed into the blood vessel lumen and closed in the orientation that the second blade cut through the surface of the umbilical cord and opened the blood vessel (BLOP).

In the last step, the blood vessel was



Genicular artery embolization for treatment of knee osteoarthritis pain: Systematic review and meta-analysis

Bedros Taslakian [a,*], Larry E Miller [b], Tarub S Mabud [a], William Macaulay [c], Jonathan Samuels [d], Mukundan Attur [d], Erin F Alaia [e], Richard Kijowski [e], Ryan Hickey [a], Akhilesh K Sista [f]

Objective

GENICULAR ARTERY EMBOLIZATION (GAE) IS A NOVEL, MINIMALLY INVASIVE PROCEDURE FOR TREATMENT OF KNEE OSTEOARTHRITIS (OA). THIS META-ANALYSIS INVESTIGATED THE SAFETY AND EFFECTIVENESS OF THIS PROCEDURE.

DESIGN

OUTCOMES OF THIS SYSTEMATIC REVIEW WITH META-ANALYSIS WERE TECHNICAL SUCCESS, KNEE PAIN VISUAL ANALOG SCALE (VAS; 0–100 SCALE), WOMAC TOTAL SCORE (0–100 SCALE), RETREATMENT RATE, AND ADVERSE EVENTS. CONTINUOUS OUTCOMES WERE CALCULATED AS THE WEIGHTED MEAN DIFFERENCE (WMD) VERSUS BASELINE. MINIMAL CLINICALLY IMPORTANT DIFFERENCE (MCID) AND SUBSTANTIAL CLINICAL BENEFIT (SCB) RATES WERE ESTIMATED IN MONTE CARLO SIMULATIONS. RATES OF TOTAL KNEE REPLACEMENT AND REPEAT GAE WERE CALCULATED USING LIFE-TABLE METHODS.

Results

In 10 groups (9 studies; 270 patients; 339 knees), GAE technical success was 99.7%. Over 12 months, the WMD ranged from −34 to −39 at each follow-up for VAS score and −28 to −34 for WOMAC Total score (all $p < 0.001$). At 12 months, 78% met the MCID for VAS score; 92% met the MCID for WOMAC Total score, and 78% met the SCB for WOMAC Total score. Higher baseline knee pain severity was associated with greater improvements in knee pain. Over 2 years, 5.2% of patients underwent total knee replacement and 8.3% received repeat GAE. Adverse events were minor, with transient skin discoloration as the most common (11.6%).

Conclusions

Limited evidence suggests that GAE is a safe procedure that confers improvement in knee OA symptoms at established MCID thresholds. Patients with greater knee pain severity may be more responsive to GAE.

Intra-Articular Mesenchymal Stem Cell Injection for Knee Osteoarthritis: Mechanisms and Clinical Evidence

Pengxu Wei [1,2,*], Ruixue Bao [3]

MSCs and their secretion may repair damaged issues via diverse mechanisms including chondrocyte differentiation, trophic effects, and immunomodulatory functions. A larger amount of injected MSCs may be expected to induce better effects.

Material and method:

Inclusion criteria

- 1)Symptomatic knee OA: including people who have daily pain which has started at least 3 months before the visit
- 2)Patients in mild to moderate stages of OA
- 3)Radiographic changes should be observed in the specified knee

Exclusion criteria

- 1)Intra-articular steroid, Hyaluronic acid in the knee or Oral steroid during the last 6 months
- 2)Local or systemic infection
- 3)Mori deviation in the form of valgus more than 10 or varus
- 4)Simultaneous ankle or hip pain on the same side
- 5)Any manifestation of secondary arthritis
- 6)History of recent malignancy
- 7)Autoimmune diseases

Material and method:

-out of 500 patients that were screened,30 patients (27 women and 3 men, mean age 61-year-old) were included in this study

-The study was accepted by the University IRB and Ethic Committee

-We selected the opposite knee as a control group, and initially, their WOMAC and VAS scores were similar.
-The WOMAC score was recorded one day prior to the intervention and at 1, 3, 6, 9 and 12 months post-intervention.

Material and method:

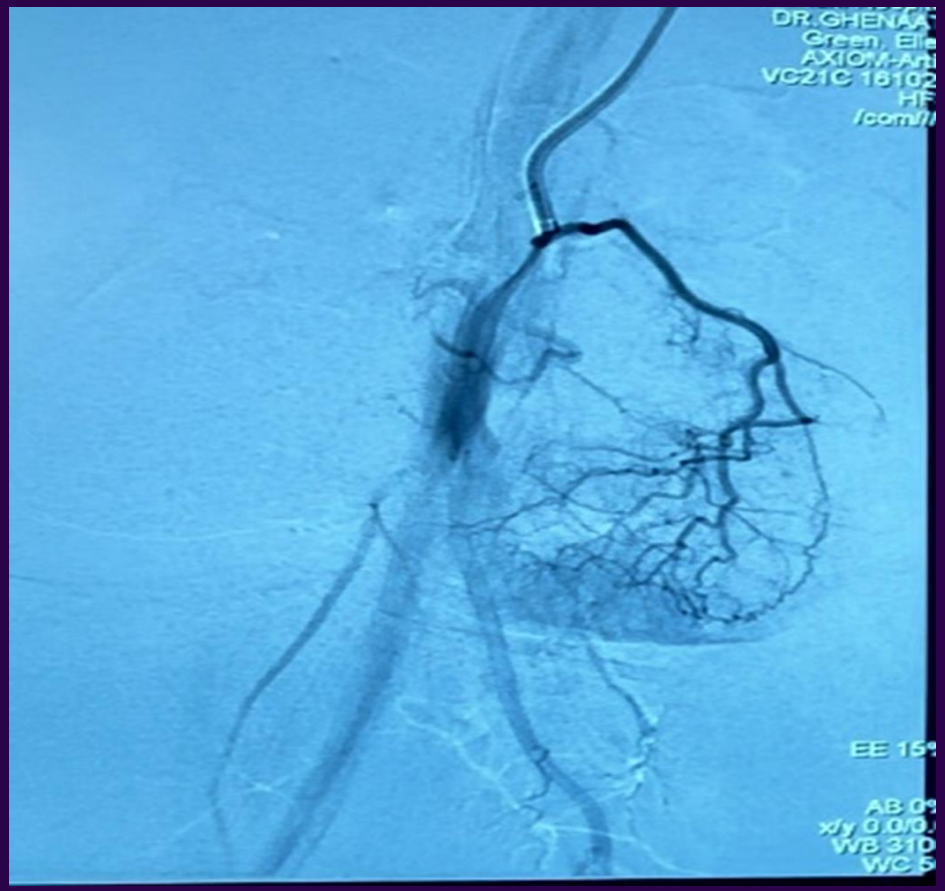
Technique of injection:

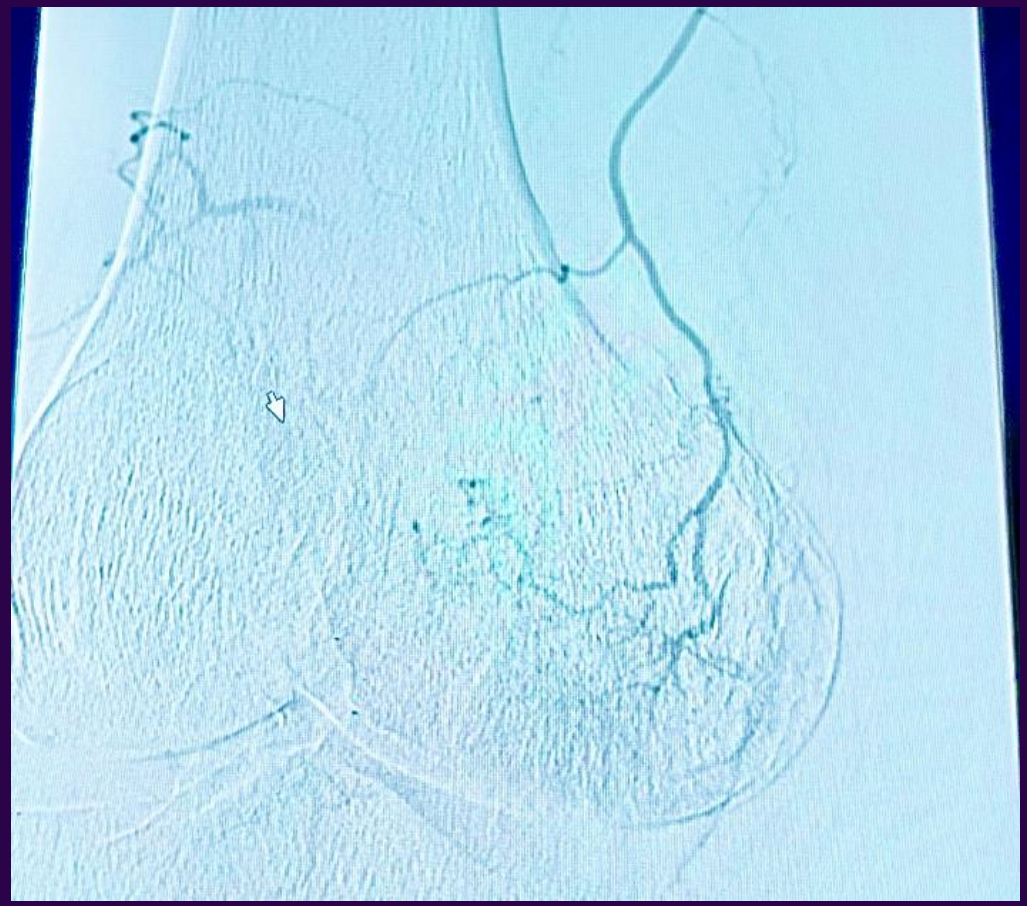
-Under Local anesthesia, the contralateral common femoral artery was accessed

-Using **JB1, or cobra catheter**, the genicular artery leading to arterial blush were selected
- Then the cells injected slowly

-**5 cc of distilled** water to wash the remain cells form the catheter

Material and method:





Angiographic pictures of the genicular artery and the blush

Material and method:

-Patient were admitted overnight and were all discharged the following day with this order :

RX/

1)Cephalexin 500mg q6 hours for 10 days(to prevent infection)

2)Apixaban5 mg BID for 2weeks(to prevent DVT because of immobilization)

-Patients were asked to avoid any heavy activity for a week

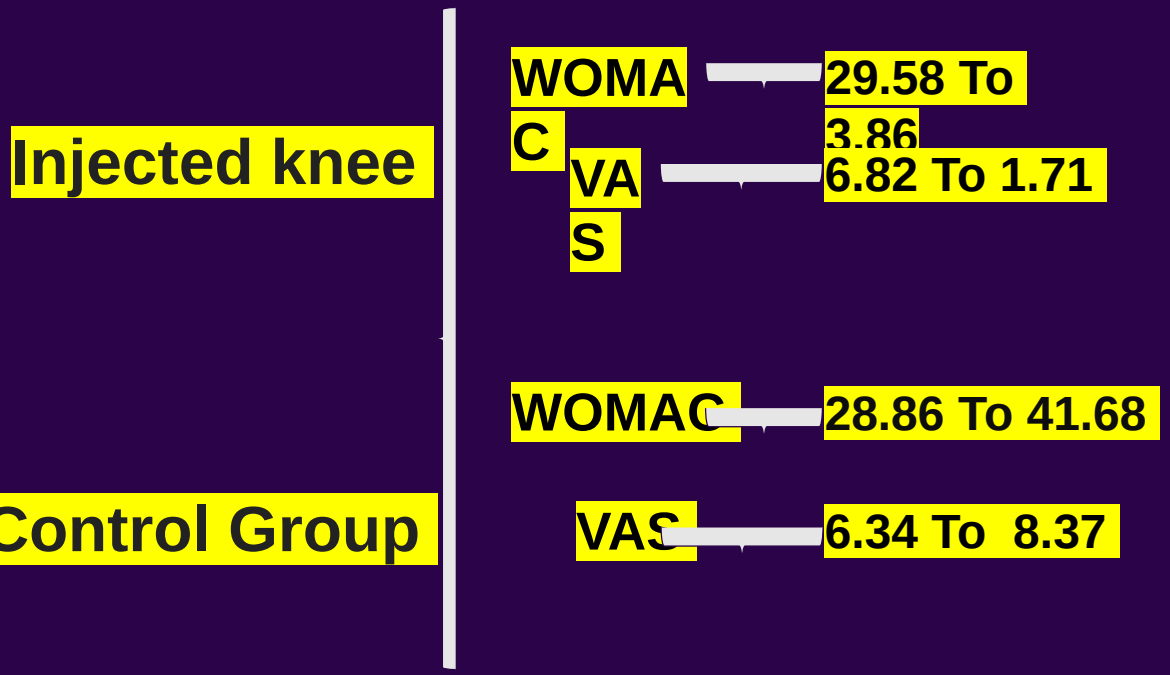
Results:

- Technical success was 100%
- No Immediate major complication
- 2 patients had some self-limited skin discoloration
- All the patients have successfully completed their clinical follow-up as scheduled.

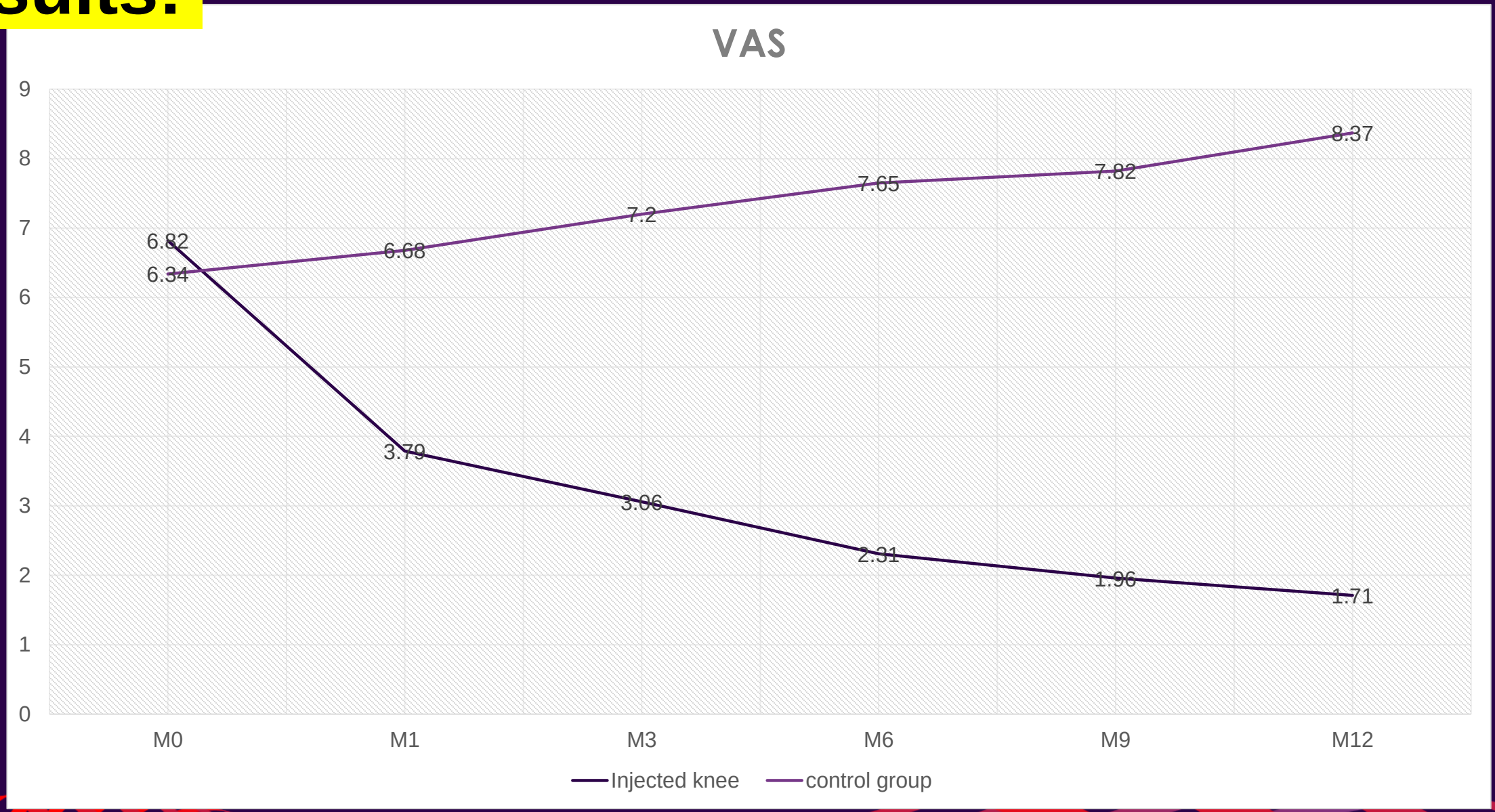
- There was reduction of WOMAC score every 3 months and the most reduction was during the first month

Results:

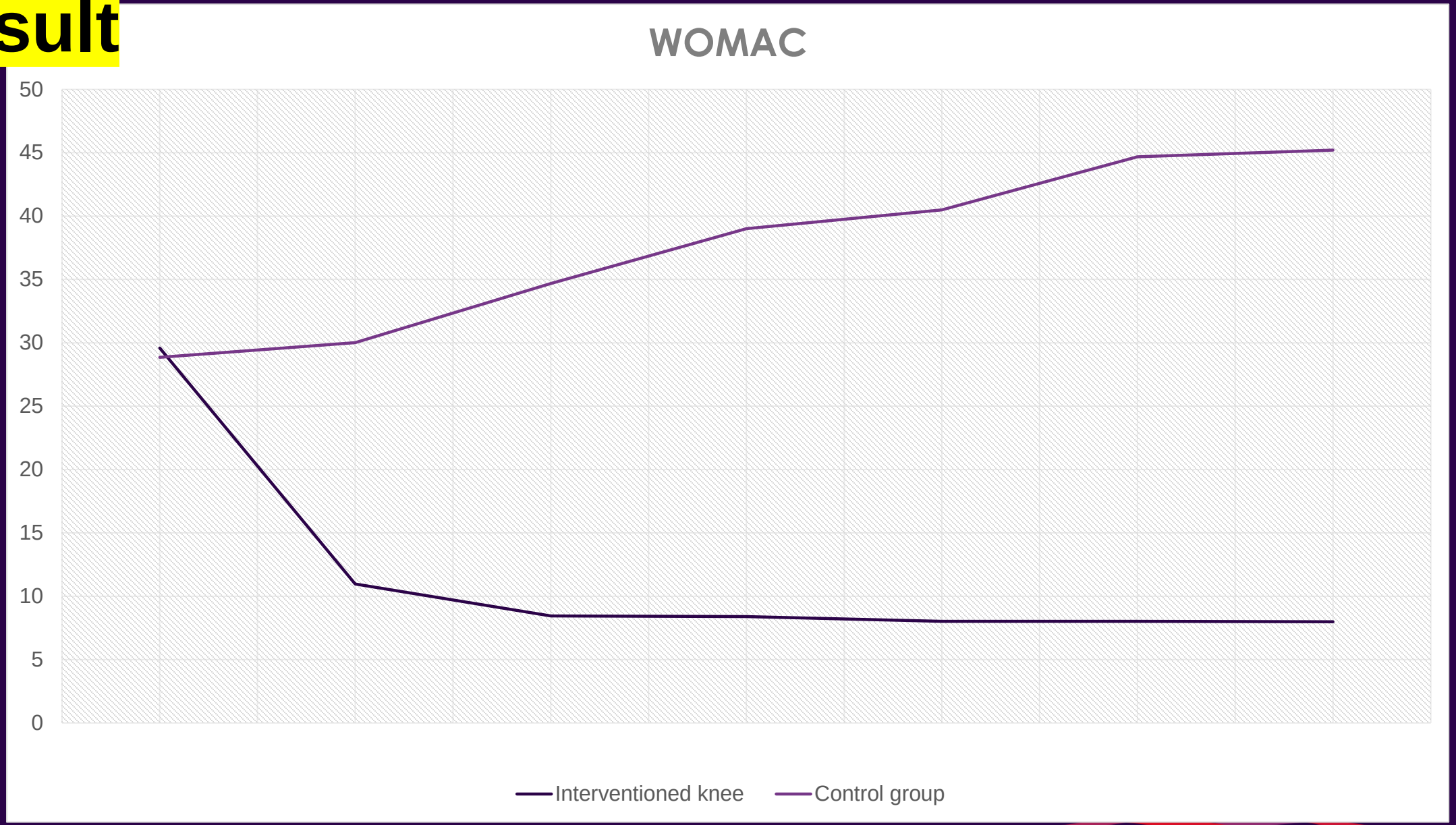
After 12 months, we observed significant differences in the final WOMAC and VAS scores between the two groups!



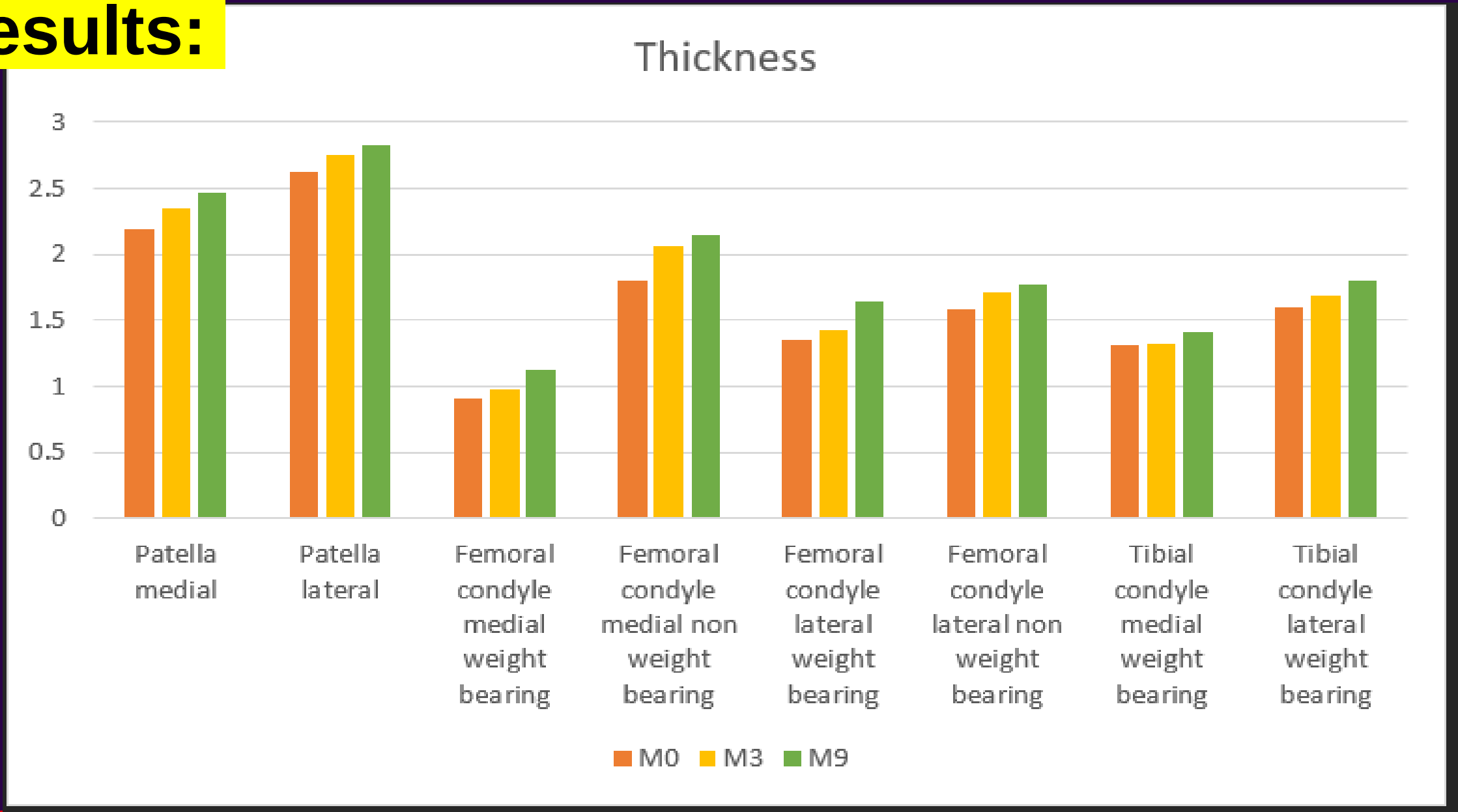
Results:


VAS
9
8
7
6
5
4
3
2
1
0
6.82
6.34
3.79
3.06
2.31
1.96
1.71
6.68
7.2
7.65
7.82
8.37
M0
M1
M3
M6
M9
M12
Injected knee
control group

Results:


WOMAC
50
45
40
35
30
25
20
15
10
5
0
Interventioned knee
Control group

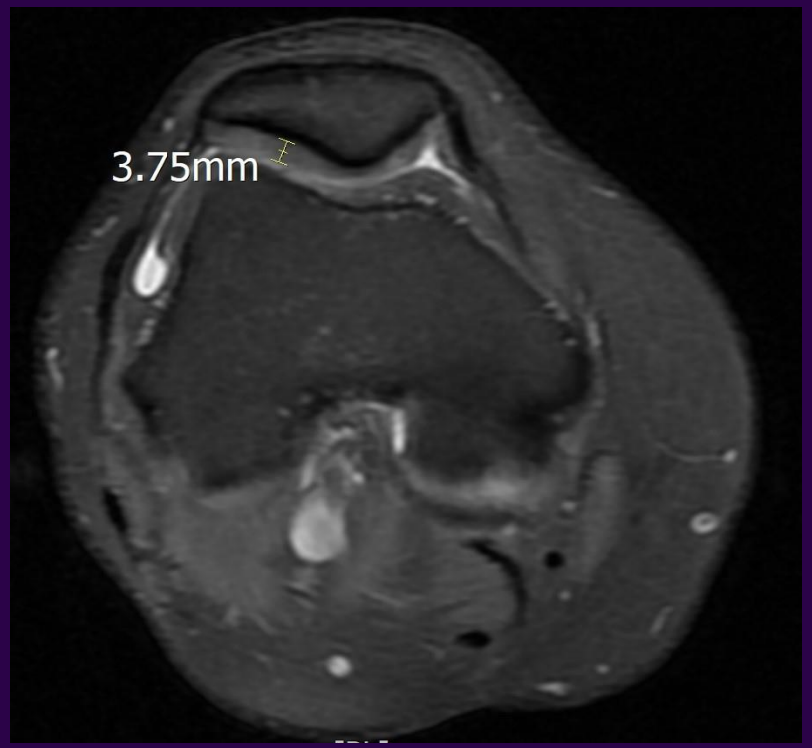
Results:

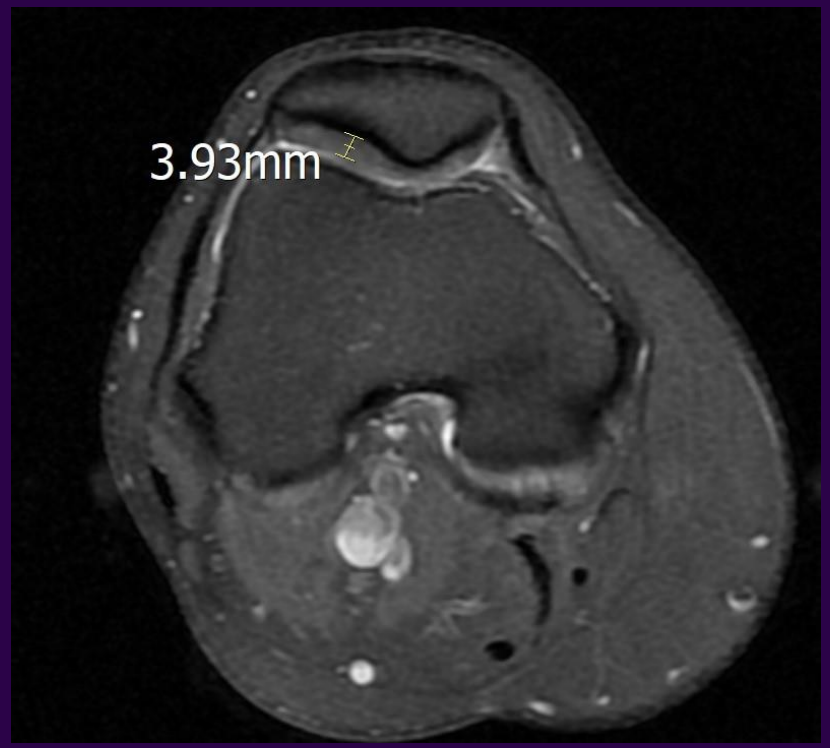

Thickness
3
2.5
2
1.5
1
0.5
0
Patella medial
Patella lateral
Femoral condyle medial weight bearing
Femoral condyle medial non weight bearing
Femoral condyle lateral weight bearing
Femoral condyle lateral non weight bearing
Tibial condyle medial weight bearing
Tibial condyle lateral weight bearing
M0
M3
M9

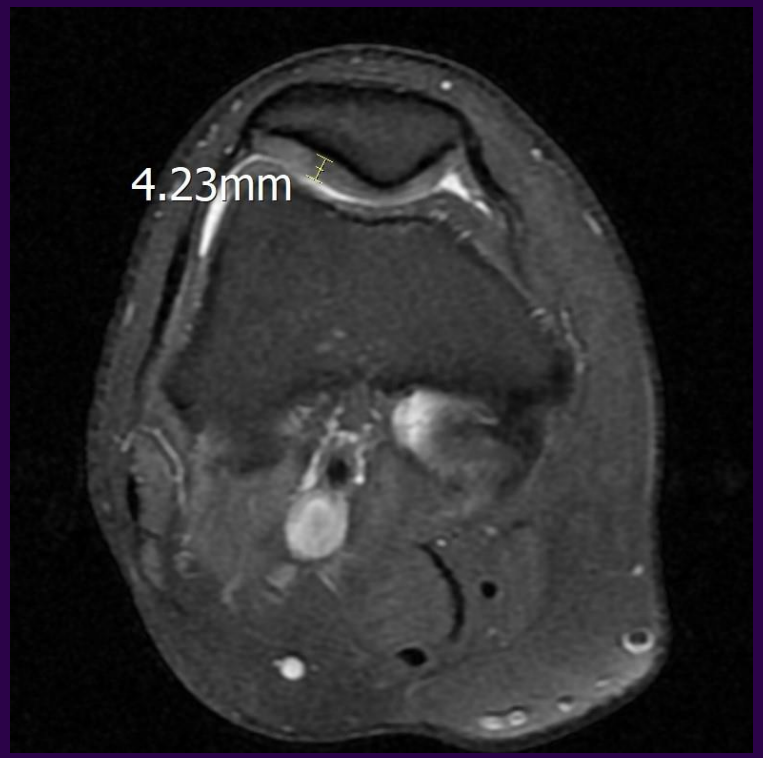
Results:

Average size (mm)	M0	M3	M9
Patella medial	2.19125	2.3475	2.4675
Patella lateral	2.6275	2.755	2.81875
Femoral condyle medial weight bearing	0.90125	0.9775	1.12625
Femoral condyle medial non weight bearing	1.8075	2.06	2.1475
Femoral condyle lateral weight bearing	1.36125	1.42125	1.6425
Femoral condyle lateral non weight bearing	1.58875	1.72125	1.77375
Tibial condyle medial weight bearing	1.305	1.31875	1.4075
Tibial condyle lateral weight bearing	1.59875	1.69	1.8075

Results:

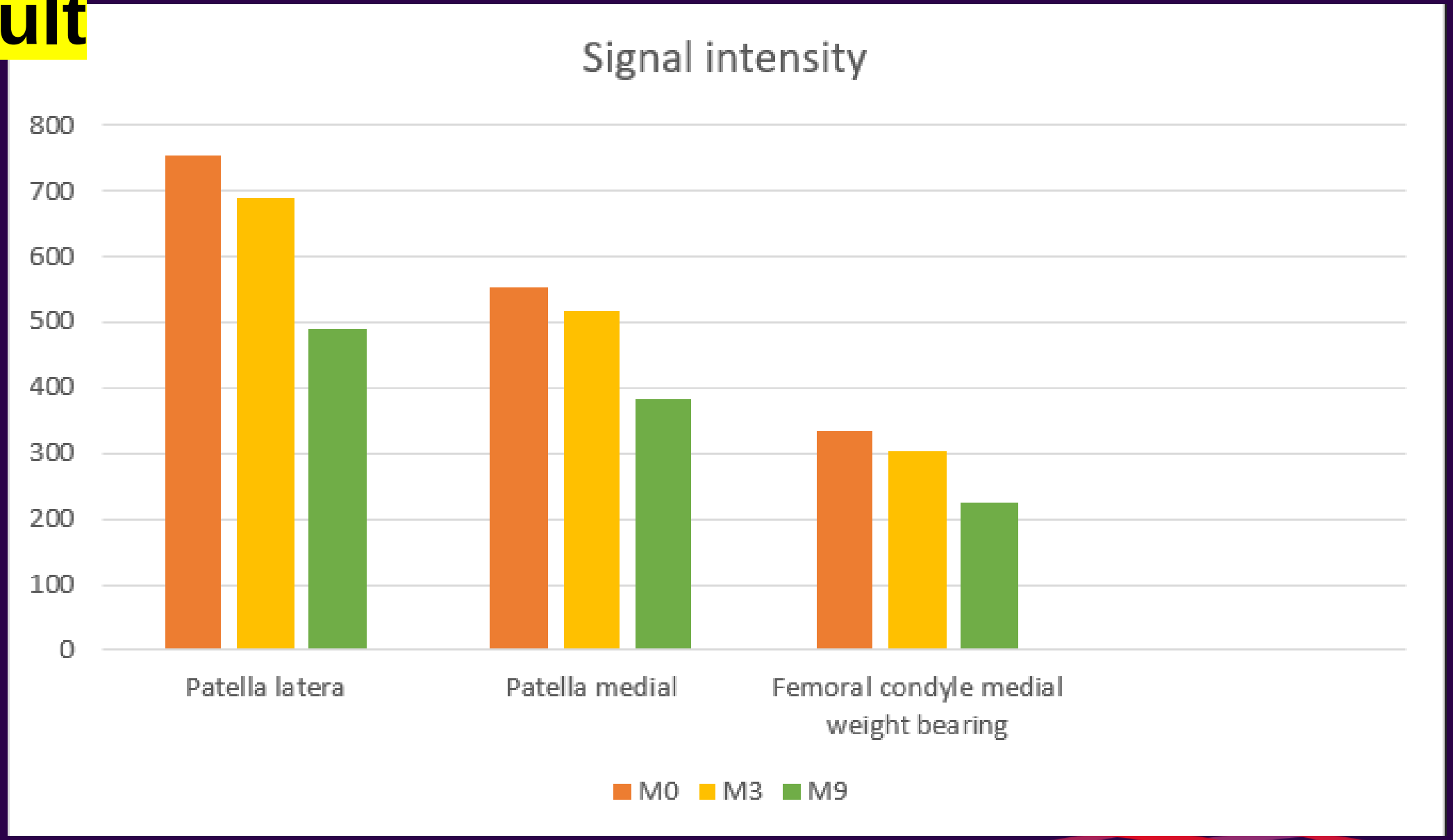




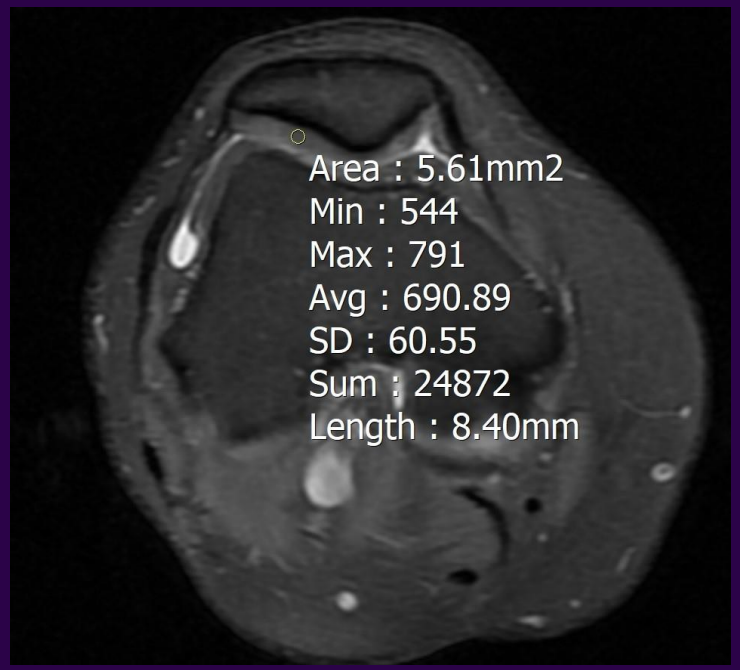


M0 **M6** **M12**

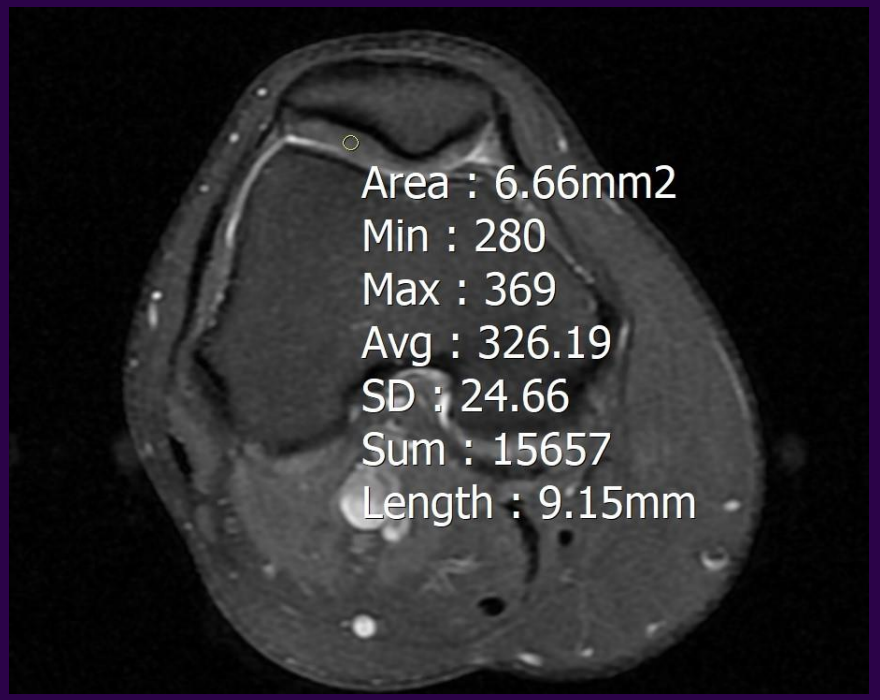
Results:


Signal intensity
800
700
600
500
400
300
200
100
0
Patella latera
Patella medial
Femoral condyle medial weight bearing
M0
M3
M9

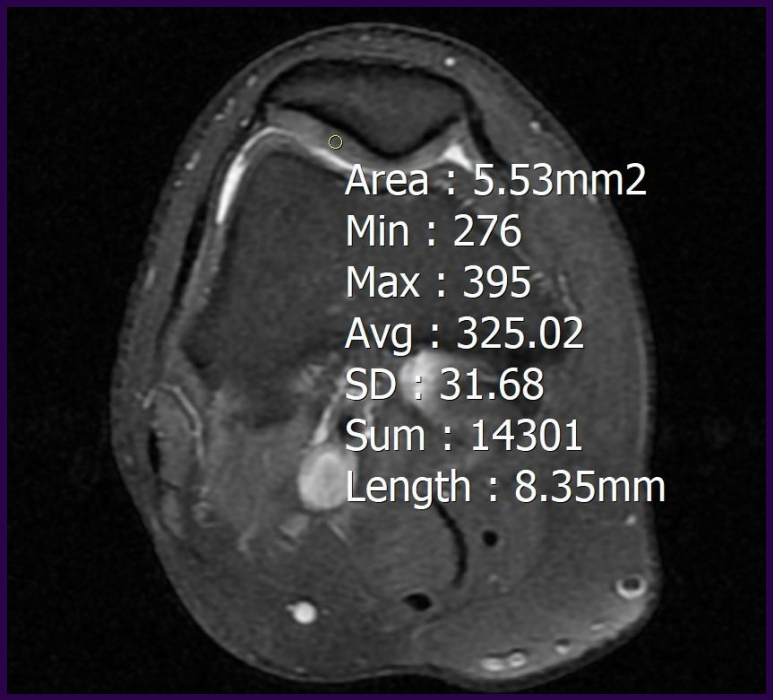
Results:



M0



M6



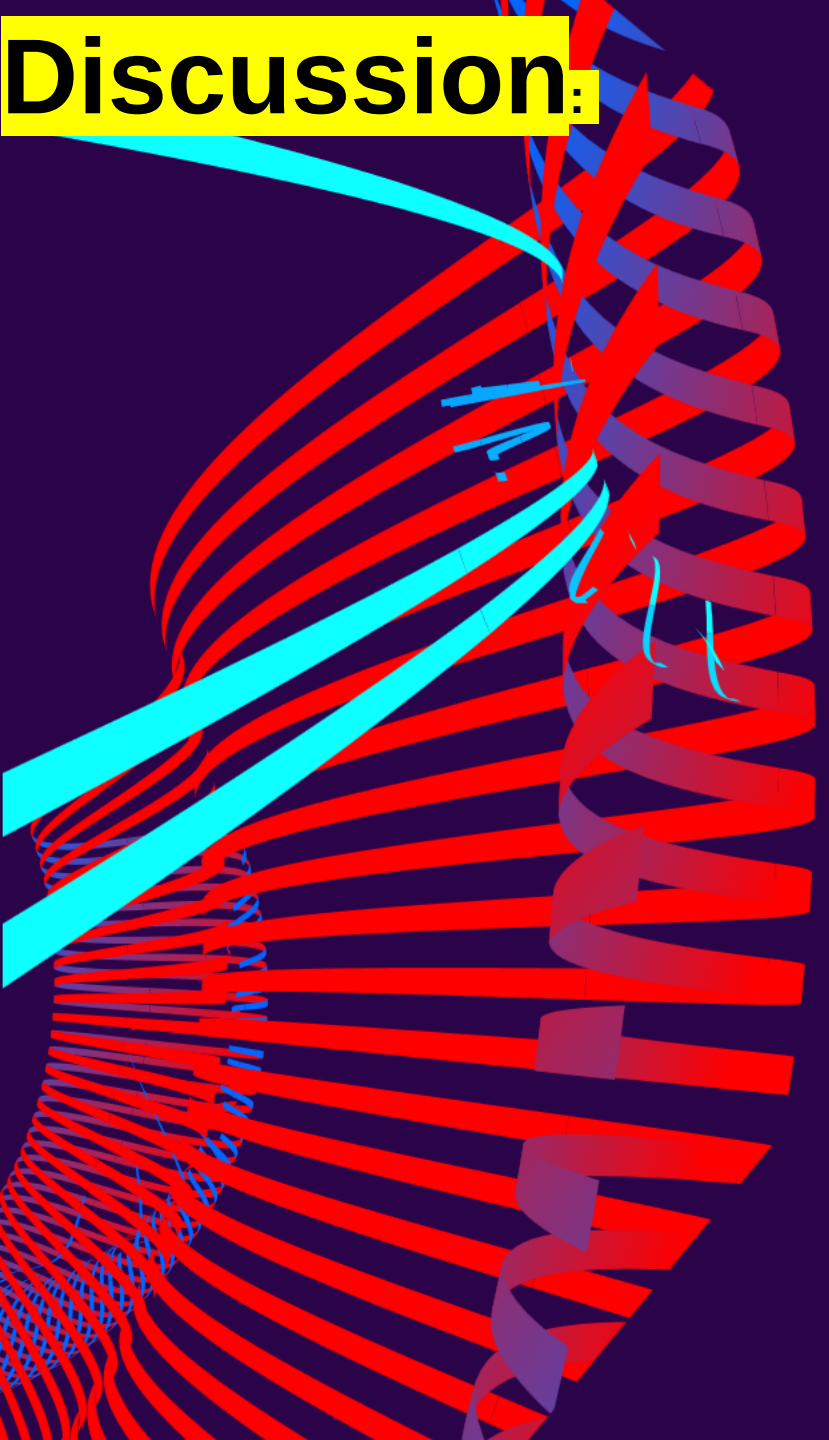
M12

Conclusion:

As the WOMAC score clearly indicates a significant reduction in pain, along with notable improvements in all clinical symptoms, observed in all patients after 12 months, this procedure can be regarded as a substantial advancement in pain management for patients with knee osteoarthritis (OA).

Cartilage regeneration measured as 0.2mm in 9 months which shows the potent ability of stem cells to differentiate to other tissues!

Discussion:



What we can confidently state is :
Intra-arterial MSCs injection in Genicular artery, is

Safe

Effective

And can:

Decrease pain and WOMAC

VAS

Signal intensity

Possibly: Cartilage regeneration

“And also prevent progress of OA”

CLINICAL NEWS | MRI

Can stem cell injections treat knee osteoarthritis?

Will Morton

Dec 5, 2023

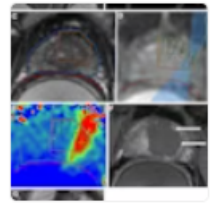
MRI shows that injections of mesenchymal stem cells can improve clinical symptoms of patients with knee osteoarthritis and may result in early cartilage regeneration, according to research delivered November 30 at RSNA in Chicago.

A group led by first author Hossein Ghanaati, MD, of Tehran University of Medical Sciences in Iran, presented a study demonstrating that the approach significantly reduced pain in patients, with MRIs suggesting regeneration of the affected knee cartilage.

Latest in MRI

MRgFUS shows promise in treating prostate cancer

MARCH 7, 2024



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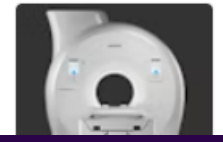

Cardiovascular and Interventional Radiological Society of Europe

CIRSE

CONFIRMATION OF PRESENTATION

Maedeh Rouzbahani

has kindly presented the Scientific Paper

275.6 / Treatment of knee osteoarthritis with genicular artery injection of mesenchymal stem cells: preliminary results

within the Scientific Paper Session "SP 275 – Updates in embolotherapy"
at the CIRSE 2023 in Copenhagen/DK.

Adam Hatzidakis

Copenhagen, September 2023

Scientific Programme Committee Chairperson 2023

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17TH ANNUAL

GEST 2023

GLOBAL EMBOLIZATION ONCOLOGY SYMPOSIUM TECHNOLOGIES

Best Scientific Abstract
2nd Place

Presented to:

Hussein Ghanaati

Abstract Title: Treatment of knee osteoarthritis with genicular artery injection of mesenchymal stem cells: preliminary results

Jafar Golzarian
Dr. Jafar Golzarian
Active Founder
GEST

Marc Sapoval
Dr. Marc Sapoval
Active Founder
GEST

GEST 2023 held May 18-21, in New York City, New York

Article published online: 2024-07-01

Simplifying Stem Cell Therapy for IRs: Exploring New Horizons in Interventional Radiology and Cell Therapy

Hossein Ghanaati[1] Maedeh Rouzbahani[1]

BEST ORAL PRESENTATIONS
13:00 - 13:30

Hall C | LECTURE

Umbilical-Derived Mesenchymal Stem Cell Infusion Via Medial Circumflex Femoral Artery For Early-Stage Osteonecrosis Of The Femoral Head: A Pilot Study

H.Ghanaati(Iran)

Initial Periprocedural Experience Using Computer Assisted Vacuum Thrombectomy With Lightning Flash For The Treatment Of Pulmonary Embolism: A Subgroup Analysis Of The Strike-Pe Study

O. Ahmed (USA)

Randomized Embolization Trial For Neuroendocrine Tumors (Retnet)

G. El Haddad (USA)

Mechanical Thrombectomy In Lower-Extremity Deep Vein Thrombosis: Final 2-Year Outcomes From The Completed Clout Registry

A. Shaikh (USA)

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NEWS

ADDITIONAL STORY IDEAS
RSNA 109th SCIENTIFIC ASSEMBLY AND ANNUAL MEETING

In addition to the presentations described in RSNA news releases, the following presentations have been identified as particularly newsworthy. Times, locations and abstracts for the presentations can be found in the online program.

Scientific Presentations

Mon. Nov. 27, #M6-SSNPM01-6, *Reducing Residuals of Contrast Agents in Wastewater: Preliminary Results of the GREENWATER Study,* Moreno Zanardo, Ph.D.

Tues. Nov. 28, #T7-SSNPM02-1, *Pink on Pink Aggression,* Ami Gokli, M.D.

Scientific Posters

#10308, *Quantitative Chest of Marijuana Use*, Ozgu Alcali, M.D.

#15454, *New Method of Knee OA Treatment with Intra Genicular Artery Injection of Mesenchymal Stem Cells*, Maedeh Rouzbahani

#14703, *Long-term Effects of a Breast Cancer Screening Programme on Breast Cancer Incidence and Mortality: Results from a Cohort of 2.6 million Women,* Amanda Dibden

#10060, *Enhancing Patient Communication with Chat-GPT in Radiology: Evaluating the Efficacy and Readability of Answers to Common Imaging-related Questions,* Emile Gordon, M.D.

#14525, *MRI Volumetric of Limbic System in Burnout Syndrome and Vigilant Attention in a Population with Nocturnal Shifts,* Christian Torres Ramirez, M.D.

pairs
Pan Arab International Radiology Society
الجمعية العربية لأشعة التداخلية

Neuro pairs
Pan Arab International Radiology Society
الجمعية العربية لأشعة التداخلية
Interventional Neuroradiology & Stroke

CERTIFICATE OF APPRECIATION

The Board of Directors
hereby expresses appreciation to

Maedeh Rouzbahani

for being winning the Best Oral Presentation award for the abstract titled Umbilical-Derived Mesenchymal Stem Cell Infusion Via Medial Circumflex Femoral Artery For Early-Stage Osteonecrosis Of The Femoral Head: A Pilot Study

PAIRS 2025

held on Wednesday, 9th to Saturday, 12th of April, 2025
at the Dubai World Trade Center, Dubai - United Arab Emirates

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President of PAIRS	Chair of PAIRS 2025 Program Committee	Head of PAIRS 2025 Scientific Programs	Chair of PAIRS 2025 Neuro Program	Head of PAIRS Neuro Committee

J Vasc Interv Radiol

. 2025 Oct;36(10):1523-1531.e1.

doi: 10.1016/j.jvir.2025.05.031. Epub 2025 Jun 26.

Genicular Artery Embolization Using Mesenchymal Stem Cells for the Treatment of Knee Osteoarthritis: A Prospective Study

Hossein Ghanaati [1], Maedeh Rouzbahani [2], Jafar Golzarian [3], Shahriar Kolahi [4], John David Prologo [5], Madjid Shakiba [4], Maryam Barkhordar [6], Ahmadreza Jamshidi [7], Ramin Sarami Foroushani [8], Masud Yunesian [9], Ali Ghanaati [10], Ardeshir Ghavam Zadeh [6]

Thanks for your attention