Journal of Population Therapeutics & Clinical Pharmacology

Outcomes of Arthroscopic Microfracture Technique with Platelet-Rich Plasma (PRP) Injections in the Treatment of chondral ulcers of the knee joint

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Abstract

Background: Normal hyaline cartilage regeneration is not possible in articular cartilage. In contrast, the conversion of mesenchymal tissue to fibrocartilage results in a reduced proteoglycan content relative to hyaline cartilage. Furthermore, due to its low resilience & inadequate stress response, fibrocartilage can be further degraded when subjected to joint trauma. Deterioration of articular cartilage's responsiveness to repeated stresses may result in a decline in the patient's performance, subsequently leading to chondropenia &eventually osteoarthritis.

Objective: To evaluate the effectiveness of platelet-rich plasma (PRP) injections followed by arthroscopic microfracture for therapy of chondral ulcers of the knee joint.

Patients & Methods: Twenty cases with knee problems were investigated, inspected, & scoped for their lesions. Their age range was 20–50 years. Patients were treated with arthroscopic microfractures plus platelet-rich plasma (PRP).

Results: Twenty patients underwent arthroscopic microfracture in conjunction with PRP; fourteen cases reported improvement postoperatively, and six patients showed further improvement. Due to the inadequate resistance of fibrocartilage to compressive loads and the resulting fissuring and fragmentation, the long-term outcomes are less than promising.

Conclusion: Arthroscopic microfracture followed by PRP injection has a great role in enhancing the healing of chondral lesions in short-term follow-up.

Keywords: Articular cartilage, chondral lesion, Arthroscopic microfracture, PRP injection.

Introduction

Articular cartilage surrounds the ends of bones that form diarthrodial joints, whose functions include load transmission, lubrication, and joint congruity. Histological studies reveal that articular cartilage is a subset of hyaline cartilage tissue with a collapsed extracellular matrix that lacks blood, lymphatic, or nerve supply and so has limited healing capability. It is the main form of connective tissue in the body, made up of 65–80% water and a gel-like material termed the matrix. [1]

Articular cartilage degradation is a prevalent condition that can result from various factors, including impact, repetitive loading, torsional loading, joint malalignment, & foreign materials present in the joint space, [1] leading to cartilage abnormalities in the knee, which are a leading cause of morbidity in the knee joint globally. [2] According to studies, 20% to 60% of knee arthroscopies indicate localized chondral or osteochondral abnormalities. [1-3]

Almost 10% of all arthroscopies in patients <50 years old revealed a single, well-defined grade III or IV defect according to the International Cartilage Repair Society classification [4] with an area of at least 1 cm. This can cause significant disability in relatively young patients and may be painful and debilitating. [5]

The objective of various articular cartilage repair procedures is to restore the structure & function of articular cartilage. Preventive treatment aims to alleviate symptoms rather than promote lesion healing. It is contemplated in cases involving small lesions or mild symptoms where surgical intervention could cause more damage than benefit. [1,2]

Aim of the Work:

In order to evaluate the effectiveness of platelet-rich plasma (PRP) injections in conjunction with arthroscopic microfracture for the therapy of chondral ulcers of the knee joint,.

Patients and Method

The prospective research was carried out at Al-Azahar University Hospital (EL-Zahraa) from 2018 to 2019 to evaluate the efficacy of combining platelet-rich plasma administered with microfracture (MF) in twenty cases with knee chondral defects. The purpose of this investigation was to determine whether or not the combination of MF and PRP injections could accelerate and optimize the healing process for chondral ulcers of the knee. Fifteen were men, and four were women. Individuals ranged in age from twenty-five to fifty years. Duration of following up: six months. A subsequent clinical investigation was conducted to assess and compare the functional outcomes of the cases.

Inclusion criteria:

1. Degenerative arthritis with good knee alignment.
2. Full-thickness (Outerbridge grade 3 or 4) focal chondral defects.
3. Patients with associated ligament injuries need repair.
4. Active patients are willing to participate in the postoperative rehabilitation program.
5. Patients with failed conservative treatment in the form of medication for 6–12 weeks.
6. Both males and females were included.

Exclusion criteria:

1. Patients with comorbidities, for example, local or systemic infectious diseases or metabolic diseases.
2. cases with knee malalignment.
3. Patient with previous failed surgical treatment of the chondral defect.
4. Patient is not coping with the postoperative rehabilitation program.

Methods:

Patients were exposed to the subsequent:

- Careful history-taking with a personal history of age, gender, affected side and site, and cause of the defect.
- Analysis of patients' complaints.
- Careful clinical examination: looking for swelling or muscle wasting (measure thigh circumference), deformity (with the patient standing), gait assessment. Tender points, effusion, localized swelling, palpable loose bodies, or crepitus. Range of Motion (ROM).
- Arthroscopic knee examination & identification of chondral lesions associated meniscal injuries, and/or ligamentous injuries.
- Radiographic evaluation, including a plain X-ray and an MRI.
- Rating scale: International Knee Documentation Committee (IKDC).
- Lab workup.

Operative technique:

Arthroscopic microfracture of chondral lesions: Loose bodies and tags are eliminated by shaving them with a 4.5-millimeter razor. Debride any loose or marginally connected cartilage to a perpendicular edge of viable, healthy cartilage from the articular cartilage rim surrounding the defect. The calcified cartilage layer that persists as a cap to numerous lesions is meticulously eliminated using a curette. Following this, numerous "microfractures" are created in the exposed subchondral bone plate using an arthroscopic awl (Livantec). The arthroscopic awls are available in 3 different angles (straight, 45 degrees, and right-angled) to reach areas of articular cartilage that would otherwise have been out of reach by a straight drill bit or a K wire. That is why, in this study, we do not use either K wires or drill bits. Additionally, awls produce much less thermal necrosis than motorized or even hand-driven drills, and they can control the depth of penetration. The usual penetration depth is 4–5 mm.

Holes are created with the minimum distance among them that is required to prevent one from penetrating the other, causing damage to the subchondral plate located in between. The space between microfracture pores is approximately three to four mm, or three to four holes per square centimeter. The process of creating microfracture openings typically begins at the defect's periphery, in close proximity to healthy cartilage. Holes are then advanced towards the center.

At this stage, it is common that small, loose bony fragments float out of the defect. These fragments should be removed by a shaver or suction, as during the procedure they hamper vision into the micro-fractured bed, and afterward, they may initiate an inflammatory response. Subsequently, the pressure of the irrigation fluid pump was reduced, and under direct visualization, we observed the discharge of fat droplets & blood from the holes in the knee. (Fig. 2).

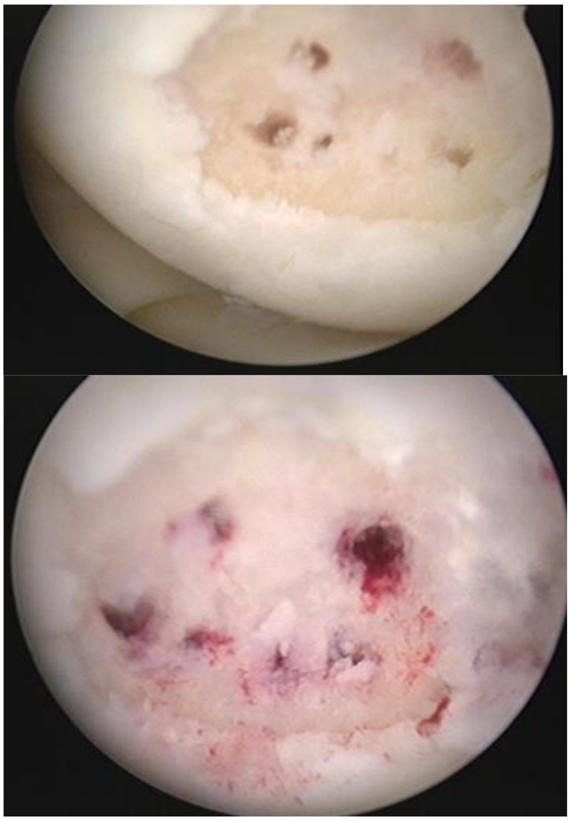

Fig. (2): Fat droplet and Blood

Once it is determined that the discharge of marrow contents is satisfactory, all instruments are removed & the joint is evacuated. If marrow release is not adequate, this usually means that the hole should be deepened by 1 or 2 mm. Further arthroscopic inspection of the knee joint is done, & any correlated injury is detected. According to the type of injury management done,

Meniscal injuries, however, medial or lateral, are classified according to the mode of injury into traumatic or degenerative types.

Tears are categorized based on their orientation: longitudinal tears, which, if displaced, can assume the form of a bucket handle; oblique flap tears; radial tears; root tears; horizontal tears; & complex tears.

According to the site of the meniscus, tears are classified into tears in the vascular area and tears in the avascular area of the meniscus.

Ligamentous injury: arthroscopic examination and assessment of all ligaments of the knee and any injury recorded, whether partial or complete, according to the type of injury management plan done; however, augmentation or reconstruction specific to every ligament (ACL, PCL, MCL, LCL), then closure of wounds with the drain in cases of ligament reconstruction or augmentation and without drain in cases of meniscal injury only.

PRP injection: A volume of 30–45 milliliters of whole blood was extracted from the cubital vein and transferred into a fifty-milliliter needle containing 3 mL of sodium citrate. Samples were subsequently placed in a centrifuge (Eppendorf, 5702 R, Germany). This desktop-sized device utilizes impermanent cylinders to collect blood. After centrifuging the anticoagulated blood at 1,500 rpm for ten minutes, the upper layer with the buffy coat is transferred to vacant sterile tubes, followed by a second spin at 3000 rpm for 5 minutes. A volume of around five milliliters of PRP was acquired for every case. The PRP was subsequently injected using a 22-gauge needle into a five-milliliter syringe. It activated 0.1 percent of the calcium gluconate in the sample.

Patients were injected with three PRP injections at one-week, two-week, and three-week intervals after surgery. Postoperative care and rehabilitation program. Follow-up clinical evaluation and postoperative rating scale (at the final visit).

Statistical analysis

The statistical analyses were performed utilizing SPSS v23, a software program developed by SPSS Inc. in Chicago, Illinois. For each measure, descriptive statistics (means, standard deviations, frequencies, and correlation coefficients) were computed. A paired sample t-test was employed to assess the significance of differences between related samples. The P values were calculated using Pearson's correlation test, with appropriate analyses including the $\chi 2$ test, one-sample t-test, and Wilcoxon test. A one-way analysis of variance (ANOVA) is utilized when comparing means in excess of two. The least significant difference (LSD) post hoc test was employed to assess multiple comparisons among various variables. The accepted margin of error was five percent, & the confidence interval was established at ninety-five percent. A p-value less than 0.05 was considered to be statistically significant.

Results

This study includes 20 patients examined arthroscopically. They were 16 males (80%) and 4 females (20%), with ages ranging from 20 to 50 years (mean: 35.20±6.40 years). Their chief complaint was pain during activities such as squatting and climbing upstairs, which affected only three cases. Thirteen cases reported pain & locking, while three cases reported pain and giving way. Fifteen patients exhibited a clear history of trauma, whereas five cases failed to show any definitive evidence of trauma.

The clinical examination of the cases indicated that nineteen cases had a positive McMurray test result, one case had a negative result, three cases had positive Lachman, anterior drawer, & pivot shift tests, all cases had negative varus & valgus stress tests, fifteen cases had a complete range of motion prior to surgery, and five cases were unable to fully flex the knee.

In sixteen cases, magnetic resonance imaging reveals MM injury, one case has lateral meniscal injury, three cases have severed ACLs, one case has OCD injury, &two cases have no associated injury. An arthroscopy showed that two cases had a single chondral lesion, seventeen cases had chondral lesions that were linked to meniscal injury, and three cases had chondral lesions that were linked to ACL ruptures. Chondral lesions were graded as grade 3 in nine cases and grade 4 in eleven patients, as per the ICRS classification. PRP injection & combined microfracture were utilized to treat every case. In sixteen cases with meniscal injuries, a partial meniscectomy was performed. In three cases, the ACL was treated with grafts from the gracilis and semitendinosus muscles.

PRP injections are given at one-, two-, and three-week intervals. The complaints were pain and locking (65.0%), pain and giving away (15.0%), pain and swelling (15.0%), and pain and locking and giving away (5.0%). The ulcer size was 1mm (25%), 1.5 mm (20%), 2 mm (30.0%), and 2.5 mm (25.0%). The ICRS grade 3 was found in (45%), and grade 4 was found in (55%). The associated injuries were PHMM tear (55.0%), ACL tear + PHMM tear (10.0%), ACL tear (5.0%), PHMM + ACL +LCL tear (5.0%), ACL tear + PCL sprain (5.0%), PHMM tear + MCL (5.0%), PHMM +LM (5.0%), and No (10.0%). The modes of injury were traumatic (75%) and degenerative (25%). However, PRP Fold 2 was found in 50% and PRP Fold 3 was found in 50%,, while the PRP volume was 3.5 cm^3 in 15%, 4 cm^3 in 40%, and 5 cm^3 in 45%, as shown in Table 1..

Table (1): Patients of chondral ulcer characteristics (n = 20).

Demographic data	No.	%
Age Group		
• <35 years	8	40.0
• 35-40 years	7	35.0
• >40 years	5	25.0
Gender		
• Male	16	80.0
• Female	4	20.0
Complain	**No.**	**%**
• Pain & Locking	13	65.0
• Pain & Giving Away	3	15.0
• Pain & Swelling	3	15.0
• Pain & Locking & Giving Away	1	5.0
Size (mm)	**No.**	**%**
• 1mm	5	25.0
• 1.5mm	4	20.0
• 2mm	6	30.0
• 2.5mm	5	25.0
ICRS Grade	**No.**	**%**
• Grade 3	9	45.0
• Grade 4	11	55.0
Associated Injury	**No.**	**%**
• PHMM tear	11	55.0
• PHMM tear + MCL tear	1	5.0
• PHMM +LM tear	1	5.0
• ACL complete tear	1	5.0
• ACL tear + PHMM tear	2	10.0
• ACL sprain + PHMM tear + LCL sprain	1	5.0
• ACL sprain + PCL sprain	1	5.0
• No associated injury	2	10.0
Mode of injury	**No.**	**%**
• Traumatic	15	75.0
• Degenerative	5	25.0
PRP Fold	**No.**	**%**
• 2	10	50.0
• 3	10	50.0
PRP Volume (cm)	**No.**	**%**
• 3.5cm	3	15.0
• 4cm	8	40.0
• 5cm	9	45.0

The IKDC differences between the three periods were highly statistically significant differences between the three periods: preoperative, 3, and 6 months postoperatively (p<0.001). Moreover, patients after 6 months had significantly higher IKDC (75.60±10.86) compared to after 3 months (61.32±14.21) and preoperative (41.92±9.42) (p<0.001 and <0.001, respectively). Moreover, patients in the mean after 6 months significantly higher IKDC (75.60±10.86) compared with after 3 months (61.32±14.21) (p<0.001). There was a statistically significant difference between the age groups regarding the mean IKDC after 6 months (p<0.02). Moreover, patients in the <35 years group had significantly higher IKDC (79.84±5.58) and 35-40 years group (78.67±5.27) compared to >40 years group (64.5 ± 16.06) at (p<0.009 & p=0.012, respectively). However, there wasn't a statistically significant (p > 0.05) variance in the mean IKDC between <35 years and 35–40 years. There is an insignificant difference between the male and females regarding IKDC at pre-, after 3 months, and after 6 months (p >0.05). Patients who complain of pain and swelling only had significantly higher IKDC after 3 months and after 6 months compared to patients who complain of pain and locking and giving away (p = 0.003, 0.009), respectively (Table 2).

Table (2): Comparison of pre and postoperative outcome according to different studied parameters and IKDC.

IKDC	Preoperative	3 months postoperative	6 months postoperative	P1	P2
Mean ± SD	41.92±9.42	61.32±14.21	75.6±10.86	0.000*	0.000*
Age Group (years):				0.229	0.020*
• < 35	41.95±11.02	62.74±15.38	79.84±5.58		
• 35-40	45.29±2.60	66.27±3.32	78.67±5.27		
• > 40	37.14±12.28	52.12±19.38	64.50±16.06		
• Males:	40.65±10.09	60.02±15.54	75.21±11.86	0.427	0.762
• Females:	46.98±3.28	66.53±5.09	77.13±6.32		
Complain:				0.003*	0.009*
- Pain & Locking	43.52±9.04	61.83±8.18	73.11±6.18		
- Pain & Giving away	30.77±10.95	50.70±9.11	76.73±8.45		
- Pain & Swelling	46.61±3.19	78.40±2.19	88.80±3.13		
- Pain, locking, giving away	43.40±0.00	71.70±0.00	81.50±0.00		
Size (mm):				0.000*	0.000*
• 1	37.78±12.48	68.44±8.26	87.78±6.11		
• 1.5	46.98±2.60	71.70±3.24	82.55±2.79		
• 2	39.07±9.59	55.77±4.65	65.78±7.09		
• 2.5	45.42±8.46	52.56±3.52	63.62±7.62		
ICRS grade 3	51.87±5.20	74.33±4.82	89.90±5.28	0.000*	0.000*
ICRS grade 4	41.95±6.25	58.85±7.89	72.07±7.10		
Mode of injury:				0.026*	0.005*
• Traumatic	43.51±8.16	64.39±9.24	79.29±5.28		
• Degenerative	37.14±12.28	52.12±11.38	64.50±16.06		
PRP Fold 2	39.53±10.77	56.80±16.70	71.24±8.54	0.160	0.012*
PRP Fold 3	44.30±7.68	65.84±10.08	79.95±4.85		
PRP Volume (cm):				0.743	0.234
• 3.5	42.03±9.99	56.13±13.80	73.80±9.53		
• 4.0	43.04±9.89	60.68±15.24	71.16±14.57		
• 5.0	40.88±9.90	63.62±14.56	80.13±5.27		

*P1: between pre and 3 months postoperatively, P6: between pre and 6 months postoperatively. *P <0.05 = statistically significant. IKDC: International Knee Documentation Committee score.*

The IKDC differences between the size groups showed statistically significant differences after 3 months & 6 months (p<0.001). Moreover, patients in the 1 mm group had significantly higher IKDC after 3 m (68.44±8.26) compared to the 2.5 mm group (52.56±3.52) (p<0.001). However, patients in the 1 mm group had significantly higher IKDC after 6 m (87.78±6.11) compared to the 2.5 mm group (63.62±7.62) at (p<0.001).

There was a statistically significant difference between the ICRS grades regarding the mean IKDC pre, after 3 & 6 months (p<0.001). It was also much higher for patients in grade 3 (51.87±5.20) than for those in grade 4 (41.95±6.25) (p = 0.003). It was also higher for grade 3 after 3 months (74.33±4.82) than for grade 4 (58.85±7.89) at (p<0.001), and it was higher for grade 3 after 6 months (89.90±5.28) than for grade 4 (72.07±7.1) at (p<0.001). There was a statistically significant difference between the modes of injury regarding the mean IKDC after 3 & 6 months (p = 0.026 and p = 0.005, respectively). Moreover, patients in the traumatic group had significantly higher IKDC after 3 months (64.39±9.24) compared to degenerative (52.12±11.38) at (p = 0.026), while patients in the traumatic group had significantly higher IKDC after 6 months (79.29±5.28) compared to degenerative (64.50±16.06) at (p = 0.005) (table 2).

There was a statistically significant variance between the PRP folds regarding the mean IKDC after 6 months (p = 0.012). Moreover, patients in the 3-fold group had significantly higher IKDC after 6 months (79.95±4.85) compared to 2-fold (71.24±8.54) at p=0.012. There isn't statistically significant variation among the PRP volumes at 3.5 cm, 4 cm, and 5 cm regarding IKDC at pre, after 3 months, and after 6 months with p > 0.05 (table 2).

Discussion

Unfortunately, articular cartilage can't grow back to normal hyaline cartilage. This means that mesenchymal tissue changes into fibrocartilage, which has less proteoglycan and can't handle stress as well as hyaline cartilage. Consequently, persistent joint trauma may induce additional degeneration in fibrocartilage. [1,2].

Patients' performance may have decreased once the articular cartilage loses its ability to respond to repeated stresses, which leads to chondropenia and eventually osteoarthritis [6].

The objective of our research was to determine how PRP injection and combined microfracture affected chondral lesions. In this study, twenty cases with knee problems were examined, investigated, and scoped for lesions. Two patients (ten percent) presented with an isolated chondral lesion, ten cases (fifty percent) presented with a medial meniscus tear correlated with the chondral lesion, one case (5%), one case (5%), and one patient (5%), respectively, presented with an associated medial meniscus tear & lateral meniscus with chondral lesions, and three cases (5%), respectively, presented with correlated ACL & medial meniscus tears with the chondral lesions.

These findings are consistent with those documented by Curl et al. [7] Chondral lesions can manifest independently or in conjunction with meniscal or ligamentous injuries. It has been observed that compromised meniscal integrity or instability of the ligaments can elevate the load on the chondral surface, potentially exacerbating pre-existing defects &impeding successful repair.

In addition, our findings are consistent with the observation made by Scopp and Mandelbaum's [8] that the most common type of articular cartilage injury encountered in orthopedic surgeries is meniscal tears accompanied by partial-thickness articular cartilage defects.

Seventy-five percent of chondral lesions identified in our study were in patients younger than forty years old. The chondral lesion was categorized according to ICRS grade; grade 3 was observed in nine cases, accounting for 45% of the total cases, whereas grade 4 was present in 11 cases, representing 55% of the total.

These findings are consistent with those documented by Scopp and Mandelbaum [8], who suggest that chondral & osteochondral injuries are prevalent among young athletes.

The primary problems identified in this research were pain &locking in for sixty-five percent of the cases, pain &edema for 15 percent, & pain and giving way for 15 percent of the cases. Five percent of the patients also reported pain, locking, and giving way. According to Curl et al. [7] and Moreno Morelli et al. [9], patients may exhibit symptoms such as pain, swelling, locking, or giving way without any specific complaint regarding the chondral lesion.

The majority of cases in the present research who suffered injuries for less than four months had chondral lesions of grade 3, while those who suffered injuries for more than four months had lesions of grade 4.

Scopp and Mandelbaum [8] suggested a reason for the correlation among the length & severity of chondral lesions: deterioration over time resulting from injury-induced loss of articular integrity; the dose-response curve demonstrated that chondropenia &articular cartilage defects can no longer furnish an adequate response to loading. This idea was supported by Ros et al. [11] who said that when articular cartilage can't handle repeated stresses, it leads to a drop in athletic performance, which in turn leads to chondropenia and finally osteoarthritis. [12]

In addition, Mitchel et al. [14] and DePalma et al. [13] have reported that further degeneration of injured cartilage can result from continued trauma.

Travis et al. (15) says that when the meniscus is damaged or the ligaments become unstable, the load on the chondral surface goes up. This can make the problem worse and make it harder to fix or restore.

The study demonstrated the importance of magnetic resonance imaging in identifying injuries associated with chondral lesions, such as torn ACL, M.M., or L.M. injuries. Scopp et al. [8] also provided documentation of these findings and concluded that MRI is a crucial diagnostic tool for chondral lesions because it makes it easier to spot concurrent injuries. [16]

In contrast to Loullie et al. [17], who described the significant developments in magnetic resonance imaging in recent years & its current significance as a tool for evaluating the structural integrity of articular cartilage, MRI's utilization in this study is restricted to the diagnosis of chondral lesions.

Researchers have utilized diverse magnetic resonance sequences to assess the visual characteristics of articular cartilage. While it does exhibit a multi-laminar appearance, there are a variety of views regarding the exact number of layers present in healthy articular cartilage & the histological importance attributed to each layer [17].

On the other hand, new research by Friemert et al. [18] and Vassilios has shown that magnetic resonance imaging is not a good way to diagnose chondral lesions and cannot be used instead of arthroscopes, which are the gold standard in this field [19]. Despite MRI's high specificity and low sensitivity in chondral lesion diagnosis, it may prove useful in the exclusion of chondral lesions, however. [18] Within this research investigation, three participants had a torn ACL, two of them had a combined torn MCL &ICRS grade 4 chondral lesion, and one patient had ICRS grade 3. Fifteen cases had torn M.M., six had chondral lesion ICRS grade 3, and eight had chondral lesion grade 4. One participant had a combined M.M. and L.M. tear with chondral lesion grade 4, while two cases had no correlated injury and OCD with ICRS grade 3 of chondral lesion.

Travis et al. [15] stated that loss of meniscal integrity or ligamentous instability increases the load on the chondral surface, which may exacerbate the preexisting defect and impede successful restoration or repair. This could be responsible for the observed outcomes.

The methodology employed to treat patients in this thesis involved the use of microfractures to treat chondral lesions. In cases where complications rose, such as torn ACL reconstruction or partial meniscectomy for meniscal injuries, appropriate management was performed. This approach is observed in accordance with the recommendations of Travis et al. [15], which state that effective management of associated conditions, including meniscal injury &ligament insufficiency, is critical for ensuring successful chondral repair.

Dunn et al. [19] similarly documented that an unstable tibiofemoral joint results in a proliferation of articular cartilage lesions.

Additionally, just a thirty percent decrease in the meniscus increases joint contact pressures by over 350.3%, according to Cerejo et al. [20]. Additionally, postoperative management followed the guidelines set forth by Kevin Hong et al. [21]. Twenty cases underwent microfracture; fourteen cases reported improvement postoperatively, and six cases demonstrated improvement subsequently.

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Growth factors are crucial in maintaining the homeostasis of cartilage tissue and joint structures in general [25], and their interaction helps to increase the expression and proliferation of chondral phenotypic cells. They make mesenchymal stem cells develop into chondrogenic cells, increase matrix deposition, slow down matrix degradation, and lessen the effect that inflammatory mediators have on stopping the production of proteoglycans.

Biologically, the reason for using PRP to treat degenerative joint disease is to achieve a localized concentration of growth factors capable of supporting joint homeostasis [26] and avoiding joint degeneration.

PRP is effective for chondral lesions as well as early degenerative joint disease in several in vivo investigations based on animal and clinical models. Platelet concentration has been increasingly popular in recent years.

Sanchez and colleagues presented research that compared the effects of PRP and hyaluronic acid (HA) infiltrations on 60 patients with knee arthrosis. Based on the data, the group that received growth factor treatment exhibited better results, including more efficacious management of pain &a more acceptable rehabilitation of joint excursion. [27]

In a cohort of 261 cases who underwent PRP implantation and were evaluated at six-month monitoring, the Saegusa group demonstrated an improvement in joint functionality and satisfactory management of pain symptoms. [28] Furthermore, the functional &clinical results of cases diagnosed with early-stage arthrosis & chondral lesions who underwent weekly infiltration cycles were detailed by Kon and colleagues. The results at six and twelve months indicate a significant improvement. [29] TGF-β1, alternatively referred to as differentiation inhibitor factor or cartilage-inducing factor, is a protein composed of two monomers, each containing 120 amino acids. These monomers join via a cystine knot and a disulfide bond. Among the three isoforms of TGF, β1 is the most prevalent and is secreted by almost all cells. Utilization of PRP has numerous benefits. Primarily, it is a straightforward method that is economical, quick, and necessitates only a single step to induce cellular responses at the site of injury.

Unfortunately, there isn't any agreement in the literature regarding the caliber of the newly generated tissue made using the two techniques. In a study using both methods on an ovine model, Milano et al. found that newly formed hyaline cartilage wasn't present based on histological analyses. [30] The goal of this study was to find out how well intra-articular PRP injections work when combined with microfracture in active patients with symptomatic chondral knee lesions. The main focus was on how well they helped reduce pain, improve quality of life, and get patients back to doing the things they used to do. At six months, all cases demonstrated statistically significant improvements in all scores ($p < 0.01$). This suggests that the combination of PRP injection & microfracture may be a beneficial treatment approach for cases with knee chondral ulcers measuring 2.5 or smaller.

Conclusion:

Arthroscopic microfracture followed by PRP injection has a great role in improving the healing of chondral lesions in short-term follow-up.

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