English Lectures & Papers 8 "OCD 3"

Feb. 4th (Sat) 14:00～15:00
Room 1 (Yamagin Kenmin Hall 2F Main Hall)

English Lectures 8 (L8-1)

Surgical treatment for advanced osteochondritis dissecans of the elbow

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Early detection of the disease is important in the treatment of osteochondritis dissecans of the elbow, and conservative treatment is effective for cases classified as early stages or cases in which the epiphysis is unclosed. On the other hand, surgical treatment is an option for advanced cases such as separated and isolated stage in which conservative treatment is ineffective.

We utilize 3 surgical procedures depending on the state of the lesion under arthroscopic or open observation for advanced cases. If it is determined that the osteochondral fragment still has viability and can be engrafted, reduction and fixation of the fragment is performed using bone peg graft. If the osteochondral defect resulting from free fragment removal is relatively small, especially a defect of approximately 1cm2 or less in the center of the capitellum, let alone or bone marrow stimulation with drilling is indicated. Arthroplasty using osteochondral graft is performed for larger defects.

From August 2000 to October 2019, 203 cases underwent surgical treatment at our institution and were followed up for more than 3 years. There were 49 cases of free fragment removal, 63 cases of bone nail transplantation, 5 cases of osteochondral transplantation from the non-weight bearing area of the knee, and 86 cases of costal osteochondral grafting.

In this lecture, we will explain the practice of each surgical procedure, clinical outcomes, tips and pitfalls.

【Curriculum Vitae】

March 1989	Graduated from Keio University School of Medicine
May 1989	Resident, Keio University School of Medicine
April 1991	Clinical Fellow, Keio University School of Medicine
August 1995	Orthopaedic Surgeon, General Ota Hospital
July 1997	Orthopaedic Surgeon, Shizuoka Red Cross Hospital
April 2001	Research Fellow, State University of New York at Buffalo
April 2003	Assistant Professor, Orthopaedic Surgery, Keio University School of Medicine
October 2009	Lecturer, Orthopaedic Surgery, Keio University School of Medicine
January 2016	Associate Professor, Orthopaedic Surgery, Keio University School of Medicine
April 2019	Professor, Institue for Integrated Sports Medicine, Keio University School of Medicine

QUALIFICATIONS

Japanese Orthopedic Association: Certified Orthopaedic Surgeon, Sports Doctor, Musculoskeletal Rehabilitation Doctor,
Japanese Society for Surgery of the Hand: Certified Hand Specialist, Preceptor
Sports Doctor Certified by the Japan Sports Association
Sports Doctor Certified by the Japanese Para Sports Association

AFFILIATED ACADEMIC SOCIETIES

Japanese Orthopedic Association, Japanese Society for Surgery of the Hand, Japanese Society for Fracture Repair, Japan Elbow Society, Japanese Orthopaedic Society for Sports Medicine, JOSKAS, Japanese Society for Clinical Sports Medicine, Japanese Society of Exercise Therapy, Eastern Japan Society of the Hand, American Society for Surgery of the Hand, and so on

TEAM DOCTOR/ MEDICAL ADVISOR

Yomiuri Giants, Tohoku Rakuten Golden Eagles, Hiroshima Toyo Carp, Kashiwa Reysol, Keio University Baseball Team

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English Lectures 8 (L8-2)

Which Osteochondritis Dissecans Subjects Will Heal Non-Operatively? An Application of Machine Learning Methods to the ROCK Cohort

Kevin G. Shea、Thomas Johnstone、Marc Tompkins、Matthew Milewski、Carl Nissen、and the ROCK Group.
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Introduction: Healing PREDICTION for Osteochondritis dissecans (OCD) lesions can guide physicians and families about appropriate treatment decision for surgical and non-surgical treatment. There are limited evidence-based guidelines to predict which lesions will heal with non-operative treatment. This study aims to design an algorithm to determine whether a patient with OCD of the knee will heal with non-operative treatment.
Methods: Subjects were queried from the Research in OsteoChondritis of the Knee (ROCK) cohort. Inclusion criteria were that each patient meets the definitions for failure or success of nonoperative management. Failure of nonoperative management was defined as the crossover from nonoperative management to surgery at any point at or beyond three-month follow-up. Successful healing was defined as complete healing on imaging with full return to sports participation.
A multivariate logistic regression model developed by previous studies was used as a baseline for classification performance. A second logistic regression model and a suite of machine learning algorithms were developed with hyperparameter-tuned five-fold cross validation. Sex, race, lesion plane on sagittal and coronal MRI, and lesion anatomical location were added as additional features. The classification accuracy and area under the receiving operating curve (AUC) were recorded.
Results: The logistic regression model developed by previous studies had an accuracy of 65.3% and an AUC of 0.645. Normalized lesion width was associated with an increased likelihood that a lesion would heal nonoperatively. This study's regression model had an accuracy of 71.2% and an AUC of 0.750. In this model, coronal lesion location in the lateral or medial-most zone and sagittal lesion location in the posterior zone on MRI were associated with an increased likelihood of successful nonoperative treatment. Increased normalized lesion width was associated with an increased likelihood of nonoperative failure.
A generalized boosted classifier had the highest accuracy and AUC of any model at 74.8% and 0.762, respectively. Normalized lesion width was the most important variable in the generalized boosting model, followed by lesion location in the posterior sagittal zone, age, the presence of mechanical symptoms, and normalized lesion length.
Conclusion: Advanced machine learning algorithms can produce optimal accuracy for clinical use. Normalized lesion width, lesion location in the posterior sagittal zone, patient age, the presence of mechanical symptoms, and normalized lesion length were the most important variables for successful lesion classification.
Significance: Machine learning models can predict which OCD lesions will heal with nonoperative management with nearly 75% accuracy.

【Curriculum Vitae】

Kevin G. Shea, MD is an orthopaedic surgeon at Stanford University Medical Center and the Lucile Packard Children's Hospital. Dr. Shea grew up in Montana and California, graduated from the UCLA School of Medicine, and completed his orthopaedic residency at the University of Utah School of Medicine. His advanced training includes pediatric orthopaedics at Rady Children's Hospital in San Diego, AO Fellowship in Bern Switzerland with Drs. Ganz (Hip), Dr. Diego Fernandez (Trauma), and Dr. Hans Staubli (sports), and Ilizarov Training in Lecco, Italy. He was the AOSSM Traveling Sports Medicine Fellow in 2008, and practiced in Boise, ID prior to joining the Stanford Faculty. Dr. Shea is a founding member of the PRiSM Society (Pediatric Research in Sports Medicine), the ROCK (Research in OsteoChondritis of the Knee) Multi-center Study Group, and the SCORE prospective cohort registry for pediatric sports arthroscopy outcomes, complications. He is a member of the AAOS (American Academy of Orthopaedic Surgeons), POSNA (Pediatric Orthopaedic Society of North America) and the AOSSM (American Orthopedic Society for Sports Medicine). In addition, Dr. Shea has authored more than 240 scientific papers and book chapters.

English Papers 8 "OCD 3"

Feb. 4th (Sat) 15:00～15:15
Room 1 (Yamagin Kenmin Hall 2F Main Hall)

English Papers 8 (L8-3)

Osteochondral Autograft Transplantation and Fragment Resection for Large Capitellar Osteochondritis Dissecans

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[2]Tokyo Sports & Orthopaedic Clinic, Japan

Background: The choice of surgical option for unstable large capitellar osteochondritis dissecans (OCD) lesions in skeletally immature athletes remains controversial.

Purpose: To investigate functional and radiographic outcomes after arthroscopic fragment resection and osteochondral autograft transplantation (OAT) for unstable large capitellar OCD lesions in skeletally immature athletes with a minimum 5 years' follow-up.

Methods: A total of 19 elbows in 19 patients (17 male and 2 females) who underwent arthroscopic resection were assigned to group 1 (mean age, 14 years [range, 13-15 years]), whereas 29 elbows in 29 patients (29 male) who underwent OAT were assigned to group 2 (mean age, 14 years [range, 13-15 years]), with the mean follow-up of 8 (range, 5-11 years) and 7 (range, 5-13 years) years, respectively. All OCD lesions were larger than one-half of the radial head diameter. Functional scores, patient satisfaction, and range of motion were compared between the groups. Radiographic changes, including superior migration, radial head enlargement, and osteoarthritis (OA) grade, were examined.

Results: All patients returned to sports activity. Functional scores, patient satisfaction, and flexion at the final follow-up were significantly improved in both groups compared with preoperative values, and differences were not significant between groups at the final follow-up. Extension showed a significant improvement in both groups (group 1: –17 to 0; group 2: –18 to –6 ; P<.001). Extension in group 1 was significantly better than that in group 2 at the final follow-up (P = .045). No elbows developed postoperative severe OA in group 1, whereas 3 elbows in group 2 had grade 3 OA; these 3 elbows had preoperative superior migration and radial head enlargement.

Conclusion: No differences were observed in clinical and radiographic outcomes between patients undergoing arthroscopic fragment resection and OAT, except for elbow extension, at a minimum 5 years' follow-up.

English Papers 8 "OCD 3"

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English Papers 8 (L8-4)

Minimally Invasive cartilage regeneration treatment for osteochondritis dissecans of the elbow

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Background: One of the most important limitations of osteochondral autograft transplant is the adverse effect on donor sites in the knee. Ultrapurified alginate (UPAL) gel is a novel biomaterial that enhances hyaline-like cartilage repair for articular defects. To avoid the need for knee cartilage autografting when treating osteochondritis dissecans (OCD) of the capitellum, we developed a surgical procedure involving a bone marrow stimulation technique (BMST) augmented by implantation of UPAL gel.
Hypothesis: BMST augmented by UPAL gel implantation improves the cartilage repair capacity and provides satisfactory clinical outcomes in OCD of the capitellum.
Methods: A total of 5 athletes with advanced capitellar OCD in the dominant elbow underwent BMST augmented by implantation of UPAL gel. The osteochondral defects were filled with UPAL gel after BMST. At a mean follow-up of 97 weeks, all patients were evaluated clinically and radiographically.
Results: At final follow-up, all 5 patients had returned to competitive-level sports, and 4 patients were free from elbow pain. The mean Timmerman-Andrews score significantly improved from 100 to 194 points. Radiographically, all patients exhibited graft incorporation and a normal contour of the subchondral cortex. Magnetic resonance imaging showed that the preoperative heterogeneity of the lesion had disappeared, and the signal intensity had returned to normal. Arthroscopic examinations consistently exhibited improvement in the International Cartilage Regeneration and Joint Preservation Society (ICRS) grade of lesions from 3 or 4 to 1 or 2 in 4 patients at 85 weeks postoperatively. Histologic analysis of biopsy specimens revealed an average total ICRS Visual Assessment Scale II histologic score of 1060.
Conclusion: The acellular cartilage repair technique using UPAL gel for advanced capitellar OCD provided satisfactory clinical and radiographic results. The present results suggest that this novel technique is a useful, minimally invasive approach for treating cartilaginous lesions in athletes.