



Chester Knee Clinic & Cartilage Repair Centre
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Chester CCI Rehabilitation Guide

For Femoral and Tibial Articular Cartilage Repair

INTRODUCTION

ChondroCelect® is advanced tissue-engineered technology used for **Characterised Chondrocyte Implantation (CCI)** articular cartilage repair. This technology was developed by TiGenix (www.tigenix.com) in Belgium and is fully licensed in EU countries as an Advanced Therapy medicinal Product (ATmP). ChondroCelect is the first cell-based product to successfully complete the entire development track from research through clinical development to approval by the European Medicines Agency in October 2009. ChondroCelect is commercially available in Belgium, the Netherlands, Luxembourg, Germany, the United Kingdom, Finland, and Spain.

ChondroCelect® is an innovative, advanced cell therapy procedure which is based on viable autologous cartilage cells (chondrocytes) that are expanded ex vivo through a highly controlled and consistent manufacturing process. This technology is an advanced form of ACI (autologous chondrocyte implantation) technology which has been used in Sweden for over two decades and for over a decade in Europe and the USA. The technique of autologous cultured chondrocyte implantation was initially researched at the Hospital for Joint Diseases in New York and further developed at the University of Gothenburg and Sahlgrenska University Hospital, Gothenburg, Sweden, in an effort to provide a treatment option for people with articular cartilage damage.



Characterised chondrocyte implantation consists of two surgical stages. The first is an initial day-case arthroscopic surgery (CCI Stage 1 or Chondral Biopsy) during which the inside of your knee joint will be assessed and a small piece of healthy articular cartilage (chondral biopsy) will be taken. The cartilage sample is sent away to a tissue-engineering laboratory where the cartilage cells (chondrocytes) are cultivated. You will be re-admitted approximately 4 to 6 weeks after your chondral biopsy for the re-implantation of the cultured chondrocytes (CCI Stage 2 or Implantation of Characterised Autologous Chondrocytes). This procedure is done through an arthrotomy (open knee surgery). The cartilage defect is debrided down to the subchondral bone and the recipient site is prepared. The defect area is covered with tissue-engineered *Chondro-Gide*® bilayer collagen membrane which is stitched in place with resorbable stitches and sealed with fibrin adhesive. This membrane is a CE-registered product, constructed specifically for the treatment of articular cartilage defects (for more information please visit www.geistlich.ch). The chondrocyte suspension is injected into this "bioactive chamber". Within this chamber the cells will undergo re-differentiation and will be stimulated by growth factors to proliferate and regenerate their specific cartilage matrix.

For more information on articular cartilage repair, ACI and CCI surgery and rehabilitation please visit www.kneeclinic.info and www.cartilagerepaircenter.org.

References:

1. Jones DG, Petersen L. **Autologous chondrocyte implantation**. *J. Bone Joint Surg Am*, November 2006; 88: 2501 - 2520. www.ejbs.org
2. Gillogly SD, Myers TH, Reinold MM. **Treatment of full-thickness chondral defects in the knee with ACI**. *J Orthop Sports Phys Ther*, October 2006; 36: 751-764. www.jospt.org.
3. Daniel B. F. Saris, Johan Vanlauwe, Jan Victor, Karl Fredrik Almqvist, Rene Verdonk, Johan Bellemans, and Frank P. Luyten. **Treatment of Symptomatic Cartilage Defects of the Knee: Characterized Chondrocyte Implantation Results in Better Clinical Outcome at 36 Months in a Randomized Trial Compared to Microfracture**. *Am J Sports Med* November 2009, 37: 105-195.
4. Johan Vanlauwe, Daniel B.F. Saris, Jan Victor, Karl Fredrik Almqvist, Johan Bellemans, Frank P. Luyten, and TIG/ACT/01/2000&EXT Study Group. **Five-Year Outcome of Characterized Chondrocyte Implantation Versus Microfracture for Symptomatic Cartilage Defects of the Knee: Early Treatment Matters..** *Am J Sports Med* December 2011; 39: 2566-2574
5. Johan Vanlauwe, José Huylebroek, Jan Van Der Bauwhede, Daniël Saris, Geert Veeckman, Vladimir Bobic, Jan Victor, Karl Fredrik Almqvist, Peter Verdonk, Yves Fortems, Nel Van Lommel, and Ludo Haazen. **Clinical Outcomes of Characterized Chondrocyte Implantation**. *Cartilage*, April 2012; vol. 3, 2: pp. 173-180.

GENERAL GUIDELINES

On the day of admission for day-case **CCI Stage 1** (arthroscopic chondral biopsy) you will be seen by our physiotherapist who will tell you more about ACI surgery and rehabilitation. On the day of admission for inpatient **CCI Stage 2** (open chondrocyte implantation) you will be seen by our physiotherapist who will demonstrate and fit the **knee brace, CPM, Cryo/Cuff cooling device**, and show you how to use your elbow **crutches**. The physiotherapist is there to answer your questions and explain any of the post-operative procedures to you, so that you will know what to expect and be prepared for your surgery and post-operative recovery. Please use this time to discuss any aspects of your treatment that may concern you.

REHABILITATION GUIDELINES

The concept of slow, gradual maturation of the repair tissue is crucial to understanding rehabilitation following CCI surgery. This process takes a long time and requires an understanding of the healing process in conjunction with considerable patience. Your cartilage repair begins life as a liquid covered with watertight resorbable membrane. Whilst the repair is solidifying it lacks strength and is inherently in danger from compression and repetitive friction.

It is therefore important for you to avoid excessive impact, loading and shearing forces for the first 12 weeks as these may damage the repair or disperse the chondrocytes. This will be explained to you further by your physiotherapist. Once the repair has solidified it goes through a process of remodelling and maturation that can continue for up to 12 to 24 months following your operation. Throughout the healing process your rehabilitation programme will be based on your individual functional progress. Remember that the consistency of your "new" cartilage is:

- after 1 week like WATER
- after 3 months like YOGHURT
- after 6 months like DOUGH
- after 9 months like CHEESE
- and after 12 months like RUBBER

To get the maximum benefit from your CCI you should adhere to your specific rehabilitation programme. This will include progressive weight-bearing, range of motion and muscle strengthening exercises. The mobility and strength exercises start directly after your operation, as this helps to stimulate the growth and proper development of the implanted cultured chondrocytes. A balance of mobility and strength training combined with functional exercises and rest will give the best CCI results.

You will spend time with your physiotherapist but the majority of your rehabilitation will be self-managed at home. A personal commitment to your rehabilitation will be essential and you will be expected to allocate sufficient time each day to complete your programme. You should be prepared to maintain the rehabilitation programme for up to twelve months following surgery. When you complete your CCI rehabilitation you should be able to resume normal activities, including most non-contact sports.

It is important to note that the following CCI rehabilitation programme is a general guide. This may vary according to the site, size and extent of your repair, as well as your individual progress and other factors such as your age, your previous activity level and other surgical procedures on your knee. It is therefore essential to keep in contact with us and your local physiotherapist throughout this process. All contact details can be found at the end of this guide.

Reference:

1. Hambly K, Bobic V, Wondrasch B, Van Assche D, Marlovits S. **Autologous Chondrocyte Implantation: Postoperative Care and Rehabilitation: Science and Practice.** *Am J Sports Med*, June 2006; 34: 1020 - 1038. <http://ajs.sagepub.com>.
2. Anja Hirschmüller, Heiner Baur, Sepp Braun, Peter C. Kreuz, Norbert P. Südkamp, and Philipp Niemeyer. **Rehabilitation After Autologous Chondrocyte Implantation for Isolated Cartilage Defects of the Knee.** *Am J Sports Med* December 2011 39 2686-2696

CCI REHABILITATION PROGRAMME

Prehabilitation and Preparation for Surgery:

Please remember that your postoperative progress will depend on preoperative muscle strength, flexibility, and general understanding of prehabilitation and postoperative rehabilitation. The aim is to:

- Increase leg muscle strength, especially the quadriceps muscle,
- Increase upper body strength to improve general mobility when mobilising on crutches, and
- Work on balance and proprioception to improve stability when you are partial weight bearing.
- All this should be continued throughout your CCI rehabilitation.

Muscle Strengthening Exercises

Restoring your leg muscle function is one of the best ways to prepare for your Stage 2 surgery.

Upper Body Strengthening Exercises

When you are partial weight bearing on crutches after CCI Stage 2 you will use your upper body, especially your arms, more than usual, so undertaking some strengthening work is useful preparation.

Balance and Proprioceptive Exercises

Balance and proprioceptive training are very important components of this rehabilitation program. Broadly speaking, proprioception is your body's ability to sense joint position in space. Proprioception helps to keep your knee joint functionally stable and it provides feedback to improve your balance. This is important for all everyday activities and even more so in sports. This will be very important for your stability when you are partially weight bearing on crutches after the Stage 2 surgery.

CCI Stage 1: Arthroscopic Chondral Biopsy

Rehabilitation following autologous chondrocyte implantation starts with the recovery from the initial arthroscopy at which the sample of your cartilage cells was taken. The time between the two CCI stages (4 to 6 weeks) provides an ideal opportunity for you to focus on preparing your body and mind for the second stage of rehabilitation. Your goals in the time between your arthroscopy (CCI Stage 1) and chondrocyte implantation (CCI Stage 2) are to:



- **Recover from the arthroscopy**

For more information on arthroscopic surgery and postoperative exercises please ask for our **Arthroscopy Brochure** or download one from www.kneeclinic.info.

- **Understand and prepare for CCI Stage 2 rehabilitation**

Recovery Following Arthroscopy

These guidelines are for those individuals who have undergone arthroscopy solely for CCI chondral biopsy. If you have had other procedures in addition to the chondral biopsy, your recovery from the arthroscopy may differ and your physiotherapist will discuss your individual rehabilitation requirements with you.

For the first few days following your arthroscopy you should expect some discomfort and swelling in your knee. This should resolve within the first couple of weeks.

Swelling is best managed by rest, ice, compression and elevation. Use icing or a Cryo/Cuff cooling device to reduce swelling. Elevate your leg whenever possible.

You can put as much weight on your operated leg as you can tolerate. Your physiotherapist will help you to mobilise following arthroscopy and provide you with crutches if necessary.

To help prevent infection you should keep your knee clean, dry and covered. You will be able to shower 2-3 days after your arthroscopy as long as you cover the incisions with waterproof plasters. You shouldn't swim or bathe until the incisions have healed (which usually takes 7-10 days).

Please note that you will not need a follow-up appointment between CCI Stage 1 and 2. However, if you have any concerns about your knee or postoperative recovery please contact the Physiotherapy Department (01244 684 314).

Understanding and General Preparation for CCI Stage 2 Rehabilitation

It is important for you to have an understanding of the CCI procedure and, in particular, the process and timescales for the healing of your cartilage repair. Your physiotherapist and your surgeon will be available to answer your questions and explain any of the post-operative procedures to you, so that you will know what to expect and be prepared for your surgery and post-operative recovery. Please use this time to discuss any aspects of your treatment that may concern you.

You will be totally reliant on your crutches for several weeks after CCI Stage 2 surgery, so it is a good idea to get used to using them before you need to rely on them. If you have crutches from your arthroscopy, practice walking by just placing your foot flat on the floor and going up and down stairs with the crutches. If you don't have crutches we will be happy to supply them.

In planning for your CCI Stage 2 rehabilitation there are some practical implications of the surgery that you may not have considered. A selection of helpful tips and suggestions to make your rehabilitation less problematic is included in the **Appendix** at the end of this guide.

CCI Stage 2: Chondrocyte Implantation

You will be admitted to hospital approximately 4 to 6 weeks after your initial day-case arthroscopic surgery for the second stage of the procedure, when the cultured chondrocytes will be implanted through open knee surgery.

If you were issued crutches and a Cryo/Cuff cooling device for use at home after your Stage 1 arthroscopy please remember to bring them with you for your second stage surgery. The physiotherapist will check your crutches and will show you how to estimate the amount of force (20kg or 44lbs) you will initially be allowed to put through your operated leg by using a set of weight scales. Twenty kilos is surprisingly little and equates to just placing your foot flat on the floor and using for balance.

The physiotherapist is there to answer your questions and explain any of the post-operative procedures to you so that you will know what to expect and be prepared for your surgery and post-operative recovery. Please use this time to discuss any aspects of your treatment that concern you.

The Postoperative Brace

Following the Stage 2 surgery you will need to wear a brace that will help to protect your knee's repaired articular surface from too much compression and friction as this could damage the graft. The brace will be measured pre-operatively, and you will be shown how to put it on, remove it and adjust it if necessary. The brace will be fitted by the physiotherapist after the surgical procedure. Please do not alter the angle at the knee joint without consulting our physiotherapist as this will be pre-set and re-adjusted as you progress. You should not remove the brace apart from short periods for exercising, washing and using the Cryo/Cuff. You should wear the brace overnight for the first two weeks. Please be aware that wearing this brace is likely to cause some discomfort. However, if you feel that this is intolerable, please discuss the situation with our physiotherapists. You will be able to mobilise using your elbow crutches and partial weight bearing through your operated leg. Our physiotherapists will teach you how to go up and down stairs.

Continuous Passive Movement Machine (CPM)

When the brace is removed for exercise you will spend some time, whilst you are an inpatient, on the CPM. When your leg is placed on the CPM, this enables you to bend your knee without any active movement by your own muscles. The degree of bend is programmed and set by the physiotherapist and will be altered as necessary, starting from 0° to 30° on day one, progressing to 0° to 60° as tolerated. When you leave the hospital you will be able to continue to progress your knee range of movement with a programme of home exercises that your physiotherapist will show you before you are discharged.

Cryo/Cuff Cooling/Compression Device

The cooling device has three components, the cuff which fits around the knee and is secured with Velcro tape, the cooler itself and the connecting tube. The cooler is filled with water and ice, once the cuff is fitted and the tube connected, elevating the cooler forces cold water into the cuff and compresses the knee. This is left in place for up to 30 minutes. You may also be provided with an auto-chiller unit that comprises of a small pump that automatically circulates the cold water and applies alternating compression and relaxation. This will help reduce post-operative pain and swelling. For more information on Cryo/Cuff see www.aircast.com.



Weight Bearing and Crutches

The knee is made up of two joints: the tibio-femoral joint and the patello-femoral joint. They function very differently mechanically. The weight of the body compresses the femur against the tibia when standing, so you will need to restrict the amount of weight you put through the leg to protect the ACI graft from these loads. For the first 4 weeks after your Stage 2 surgery you will be using two crutches to partially bear weight. To begin with, you will only be able to put a load of up to 20 kg (44 lbs) through your leg. Your physiotherapist will already have shown you how to estimate the amount of weight by using a set of weight scales prior to your surgery but will check again after your surgery. Remember 20 kg is surprisingly little and equates to just placing your foot flat on the floor and using it for balance. You will be allowed to increase the weight you put through your leg by 10-15kg per week until you are bearing full weight. Progression of weight bearing should be guided by discomfort, stability and swelling. Hopping with the crutches or non-weight bearing (NWB) is not recommended as this may "jar" the knee joint and may be detrimental to your CCI graft. You will be able to progress your range of movement as tolerated within the weight bearing restrictions without detrimentally loading your CCI graft.

The overall goals following CCI Stage 2 are to:

- Recover from the surgery
- Manage and decrease pain and inflammation
- Minimise risk of wound infection
- Protect the CCI repair
- Restore range of movement
- Increase joint stability
- Minimise impact of CCI on home/work life
- Regain normal gait pattern
- Restore confidence in the knee
- Return to pre-activity levels including sport

Although time frames have been provided in the following rehabilitation programme these are for general guidance only and Mr Bobic and your physiotherapist will tailor the programme to your specific needs, based on the location of your chondral repair and your individual functional progress.

Rehabilitation Timeline (whilst you are in hospital):

1 to 3 days:

All weight-bearing exercises at this stage, through to 4 – 6 weeks, must be practised whilst wearing the brace!

- Mobilisation allowed with crutches, PWB only, foot touching floor to balance
- Circulation exercises
- CPM
- Isometric quadriceps setting exercises, 6 seconds
- Straight leg raise, with knee and foot supported by physiotherapist
- Progressive gluteal, hamstring and calf muscle contractions
- Patellofemoral joint mobility (*do not mobilise into end range resistance or pain*)

Rehabilitation Timeline (when you go home):

1 to 3 weeks:

For the first few weeks the activities you will be allowed to do will be fairly limited as your knee is quite vulnerable and needs time to start the healing process. Your CCI graft needs some movement and loading as a stimulus for repair but this needs to be controlled with plenty of time for recovery. So it is important to do the following exercises on a regular basis, ideally at least 3 or 4 sessions per day, with rest between. Monitor wound and skin areas under the brace, check any redness or abrasions. Contact us if you notice any problems with skin healing or any discharge from the knee.

- Circulation exercises
- Inner range quadriceps (IRQ) exercises
- Active assisted and active heel slides
- Knee flexion and extension work
- Straight leg raises
- Heel raising
- Calf and hamstring stretches
- Hip extension and abduction exercises
- Early stage proprioception exercises (non weight-bearing)
- Patellofemoral joint mobility

4 to 6 weeks:

- Continue above exercises.
- Progress flexion and extension work aiming for full range of movement at 6 weeks
- Straight leg raises with 1 – 2 kilos (2 – 4.5 lbs).
- Progress balance/proprioceptive training.
- Isometric quadriceps training in different angles, 6-10 sec holds.
- Exercise bike (*passive range of flexion must be 100⁰, low resistance for mobility, 10–15 minutes a day*).
- Rowing machine, no handle, progress as range of movement allows.
- Leg press both legs, start with 10⁰ to 70⁰ minimal resistance.
- Commence hydrotherapy (*all the exercises can be done in water, swimming is allowed but no breast-stroke until 6 weeks*).
- You will gradually be weaned off the brace from four to six weeks. Your physiotherapist will assess the strength of your muscles and the stability of your knee joint before deciding when it is safe for you to start mobilising and exercising without it. You may be able to sleep without the brace from 2 weeks but it is ESSENTIAL that you replace it if you need to get up during the night.

7 to 12 weeks:

- Patients should have full range of free movement (*no resistance*).
- Full weight bearing and walking without crutches.
- Gait re-education.
- Easy functional exercises (*closed chain*).
- Small reciprocal step training including side to side/forwards to backwards.
- Isometric quadriceps training in different angles (*open chain*) progressing to *closed chain quadriceps exercises (e.g. wall slides)*.
- *Theraband* rubber: standing straight leg resistance in all directions.
- Full range rowing machine, low resistance, progress as pain allows
- Progress gym work (*no heavy weights*).
- Treadmill slow walking.
- Static exercise cycling (resistance and time on the bike can increase by raising the number of "sets") progress to outdoor cycling (gentle flat work, increasing distance and difficulty).
- Balance/proprioceptive training first with both legs, gradually only one leg. Progress weight bearing activity for proprioception (*mini-trampoline work using double then single leg stance, wobble board*).

After 3 months:

- Increase functional training.
- Treadmill – commence at fast walking and progress to a slow jog (*initially supervised by the physiotherapist*).
- Step machine/cross trainer interval training.
- Gradually increase walking distance.
- Circuit training (*supervised shuttle runs and gentle jogging – no sprints*).

After 6 months

- You should not jog or run unsupervised until 6 months.
- You can return to sports specific training at 6 months if all parameters (*determined by surgeon and physiotherapist*) are satisfactory but you must be confident in your own ability.
- Exercises should be maintained at a low level and non-contact, e.g. figure of 8 runs, gentle acceleration/deceleration runs.

Chondroprotective Agents

Glucosamine and chondroitin are very popular supplements that have received considerable press coverage over the last few years. Both GAIT and GUIDE studies suggest that, at least in the case of moderate knee pain, the combination of glucosamine and chondroitin sulphate in adequate dosage are helpful for your joint cartilage. For more information see the following article:

1. Hambly K. **Do Glucosamine and Chondroitin sulphate work? An in-depth review.** *Knee Guru Kneesights*. April 2006.
Weblink: www.kneeguru.co.uk/insights/doku.php/articular-cartilage/overview4.

RETURN TO ACTIVITY CRITERIA

When Can I Start Driving Again?

For your own safety and the safety of other road users, driving should not be commenced until your knee fully bends and is pain free (approximately 6 weeks after the operation). It is absolutely crucial that you are able to perform an emergency stop. It is advisable that you contact your insurance company to ensure you have cover. For further information please visit DVLA's website (www.dvla.gov.uk).

When Can I Return to Work?

The time when you are ready to return to work depends on the individual as well as your type of job. As a general guideline:

- Sedentary jobs from 2 to 6 weeks allowing for the fact that the leg needs to be elevated for periods and you should be able to mobilise regularly during the day. Getting to and from work may be more difficult than working, and we do not recommend long periods in a car for the first 4 to 6 weeks following surgery.
- Non-sedentary jobs should not be considered for 6 weeks. Your health and the condition of your leg will be reviewed at a 6 week post-operative clinic, when a decision can be made. It is likely that any return to work would be between 8 to 12 weeks at the earliest.
- Please remember that you have had extensive surgery, and apart from giving your knee time to heal, you must allow your body time to recover. If you return to work too soon and feel tired you are more likely to harm your knee.

When Will I be Able to Fly?

There is no universal agreement as to when it is safe to travel by plane after CCI surgery. Most orthopaedic surgeons advise their patients not to fly for 4 to 6 to weeks following Stage 2 CCI. Short flights do not seem to be a problem. However, long haul or intercontinental flights are a potential problem as there is an increased incidence of spontaneous DVT (deep venous thrombosis), even in young and healthy passengers. It is possible that sitting for long period of time in a confined space with very little leg room (usually in economy class), could predispose to the development of deep venous blood clots, even in healthy individuals, and especially in people following recent knee surgery. If you need travel by plane between 2 and 4 weeks after your ACI surgery, it would be wise to contact your airline's Medical Department and ask them for advice. Also, please discuss this issue with your GP, as you may need to take prophylactic measures and medication such as Aspirin or other anticoagulants for several weeks as well as flight socks. In any case, remember to wear flight socks and to increase your hydration (fluid intake) before, during and after the flight.

When Can I Return to Playing Sport?

Sports that can be undertaken after 6 months are swimming, cycling and golf. Sports that should not be attempted until 1 year post operation are high-impact and contact activities: badminton, tennis, squash, rugby, martial arts, hockey, football.

For further information on return to activity after ACI surgery please see the following articles:

1. Hamby K. **Return to activity after ACI survey: understanding the cartilage repair experience from the patients' perspective.** *Knee Guru Kneinsights*, May 2006. Weblink: www.kneeguru.co.uk/insights/doku.php/articular-cartilage/overview2.
2. Mithöfer K, Peterson L, Mandelbaum B, Minas T. **Articular cartilage repair in soccer players with autologous chondrocyte transplantation: functional outcome and return to competition.** *Am J Sports Med*, November 2005; 33: 1639 – 1646. <http://ajs.sagepub.com>.
3. Kai Mithoefer, Karen Hamby, Stefano Della Villa, Holly Silvers, and Bert R. Mandelbaum. **Return to Sports Participation After Articular Cartilage Repair in the Knee: Scientific Evidence.** *Am J Sports Med* November 2009 37 167S-176S

Strength Testing

Strength testing of the knee should only be carried out with the recommendation of your surgeon. Isometric test is recommended at 6 months in 15, 30 and 60°. Isokinetic test is recommended for femoral and tibial transplants at 9 months, and for patellar and trochlear at 12 months.

REHABILITATION SUMMARY

Key words for CCI rehabilitation are:

- **Mobility Exercises**
- **Protection**
- **Isometric Strength Training**
- **Functional Exercises**
- **Patience!!!**

Within these guidelines there is space for a lot of individual adjustments. The rehabilitation programme should be tailored around your individual needs and physical status, as well as increases and changes. The rehabilitation process spans a long period of time. Even when you are training alone it is advisable that your surgeon and physiotherapist are available for consultation.

ANY CONCERNS?

- It is normal to experience local swelling and increased warmth in the knee in the first few months. Generally, if pain and swelling occur in connection with exercise - reduce the load.
- Crepitation (creaking or grinding) can occur in the knee. If it is not associated with pain it can be described as a 'hypertrophic tissue growth' or soft tissue that is formed by loading.
- If a disturbing or functional "catching" occurs in the range of motion, dynamic quadriceps exercises should be performed above and below the "catch". Exercise without weight throughout the entire range of motion.

Problems: who to contact?

If you experience problems with your CCI rehabilitation please contact Nuffield Health, The Grosvenor Hospital Chester Physiotherapy Department (direct line 01244 684 314), or email Claire Lloyd, Integrated Clinical Services Manager (claire.lloyd@nuffieldhealth.com).

If you have any postoperative concerns about the surgical incision and skin healing please contact the Ward directly (01244 684 311). If you live far away from Chester Grosvenor Nuffield Hospital we may refer you to your GP or to the local hospital.

In an emergency please contact Mr Bobic directly on 07774 981 481.

Notes:

This guide was put together in July 2003 by:
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Karen Hambly, Senior Lecturer in Sports Therapy, London Metropolitan University,
Mr Vladimir Bobic, Consultant Orthopaedic Knee Surgeon, GNH Chester

This guide was rewritten in November 2006 and updated in January 2009 by:
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This guide was updated in June 2012 by: Claire Lloyd, Karen Hambly and Vladimir Bobic

Practical Advice for CCI Rehabilitation

This section has been developed for Chester Knee Clinic by Karen Hambly, Senior Lecturer in Sports Therapy, Centre for Sports Studies, Kent University, to provide some helpful tips and suggestions to make life easier for you during your CCI recovery.

Don't be daunted by the amount and extent of the advice provided. Although rehabilitation following CCI can have a significant impact on your life for a short time, individual needs will vary considerably so not all of the advice will either apply or be of interest to you, but hopefully you will find some useful tips:

Preparing for your surgery:

- It's a good idea to get your work, home and personal life in order before your surgery.
- You may not be able to get to a bank or post-office as easily as usual so it is advisable to get household and personal bill payments either paid or set up in advance to cover the first month of your recovery.
- On the work front, make sure that key individuals e.g. Human Resources Manager and your Line Manager are fully aware of your surgery and the implications it will have on your work and keep them informed of your progress as you recover. Think about arranging cover for your work, redirecting telephones, putting an 'out of office' reply on for your emails and generally informing people that you won't be available.
- You may have some difficulty in carrying out some of your normal personal grooming routine after your surgery. It is advisable to cut your toe nails, have your hair cut, wax/shave your legs (applies mainly to the ladies!) and such just before you have surgery.
- Before you have your surgery, walk around your home with your crutches and remove any obstacles or furniture that is in the way. Arrange your home to make it easier to get around – watch out for anything on the floor, cables, narrow spaces and uneven surfaces.

Things to take into hospital with you:

- When you go into hospital as an inpatient for your CCI Stage 2 surgery it may well be the first time you've stayed overnight in hospital. You will be provided with general hospital admission information with advice along with your written admission confirmation. A few additional tips are to take:
- Face and body "spritz" spray - really nice and refreshing especially when you're not able to have a proper wash or shower.
- Sports water bottle – doesn't spill, holds a reasonable amount of liquid and is easy to drink from.
- Shorts, shorts and more shorts – but they need to have fairly baggy legs to get over your knee brace.
- Dry shampoo for freshening up your hair on the days when you can't get it washed.
- Phone and address book for friends and family.

- Books, magazines, tablet and MP3 player with spare headphones, etc.
- Mobile phone and tablet or computer for internet and email access (all rooms at Chester Nuffield have good wireless signal, please ask nursing staff for the username and password).
- Other items that you may find useful to take are: a travel clock, a few personal photos, earplugs, mouthwash, bottle of squash, a laundry bag.

When you get home

- Personal support: if you can, arrange for someone to be around for the first 1 or 2 weeks after your surgery. Alternatively you may prefer to organise to stay with family or friends.
- During your recovery you may find yourself somewhat isolated due to being away from work and with a restricted social life. There are ways that you can keep in contact with friends.
- Let your friends know where you will be and how and when they can contact you before you have your surgery.
- Remember that you will need time to rest (especially in the first few weeks after your surgery) and to do your rehab so it's worthwhile try and plan your visitors.
- Make sure your computer, power, telephone and Ethernet sockets are in an easily accessible place. If you do not have good mobile phone or Wi-Fi signal in your room, a good solution is to buy extension Ethernet cable for your router.

Around the house

- Choose a chair to sit in that has arms which you can use to help you rise to standing.
- Make sure you have a chair or stool in each of the rooms you tend to use most e.g. kitchen, bathroom, bedroom.
- Place a plastic garden chair in the shower, ideally on a non-slip mat. You can then sit down whilst you're showering which makes life a lot easier and safer whilst you are partial weight bearing.
- If you've got room, place a chair in the bathroom in front of the wash basin and check that you are able to see a mirror when sitting for shaving/make-up etc.
- It's worth checking that your wash basin/sink is securely fastened to the wall as you will find you will tend to use it as a balance support when you are partial weight bearing.
- If your toilet is quite low you may find a raised toilet seat will help in the first few weeks after your surgery.
- A trolley on wheels is really useful to push around drinks, food, laundry, books and other items you won't be able to carry whilst you're on crutches.
- If you want to spend some time outdoors in the garden whilst you are recovering, look to buy or borrow a sun lounger with a full length leg rest.

Entertainment

- It is important to decide where you would like to spend most of your time once you are discharged from hospital and set up the room so that everything you may need is accessible from one place.
- Books, magazines, radio, tablet, DVDs, gaming console: make sure you have a good stock of whatever you like to keep you entertained with any remote controls close by.
- Vacuum flask – for hot or cold drinks. Fill up once and keeps you in drinks for quite a few hours.
- Multi-socket extension lead – plenty of plug sockets to power and charge e.g. mobile phones, computers, etc. Get plenty of spare batteries if items aren't mains powered.
- Make sure you have a table by your chair/bedside - lets you keep lots of stuff within arms' reach.
- Small rucksack or bumbag – good hands free way of carrying things around the house whilst you're on crutches.

Getting about

- Getting in and out of a car can be difficult, especially when your leg is in full extension in a brace. If you're sitting in the front seat, make sure the seat is back as far as possible.
- Put together a list of people who would be willing to ferry you around.
- Although not advisable in the early stages of your recovery, if you do have to undertake a long journey in a car, sitting across the back seat with both legs up is quite comfy or if the car is small another option is to take the front passenger seat out of the car (you may need to go to a garage with special tools to do this) and replace it with a large bean bag. This lets you sit on the rear seat with your leg level and supported on the bean bag.
- You will need to use crutches for quite a few weeks and some people find the handles on the elbow crutches can cause problems with chafing or blisters on your hands. Try using some pipe insulation around the grips or wearing cycling gloves whilst you're mobilising. If you find the grips on the crutches are too slippery, a cut up bicycle inner tube makes a good non-slip covering.

Clothing

- If you have your surgery during the summer you will probably be able to wear shorts most of the time, but if the weather is cooler you will need to consider warmer clothing that you can wear with a knee brace. One suggestion is to try tracksuit bottoms that have full length zips or poppers down the side of the leg.
- In a knee brace, even simple tasks such as tying shoe laces can be a challenge. Think about footwear that you can put on and take off more easily – backless shoes, flip-flops, slip on shoes etc.
- Waterproof, non-slip shoes are good for when you're in the shower and also if you go to the swimming pool to exercise.

Meals

- Before you go into hospital cook some meals that can be easily frozen and reheated.
- Think about the lay out of your kitchen shelves before your surgery and make sure the items you tend to use most are close to hand.
- Online supermarket shopping with home delivery is excellent but make sure you arrange for someone to be there when it arrives to put the shopping away for you in places that you can easily reach.

Rehabilitation planning

- Ice blocks (like the ones used in picnic cool boxes) or rolls of ice-cube bags are useful for the Cryo-cuff. It's a good idea to have two sets so that you always have one set freezing whilst one is in use.
- Find a piece of board (about 20cm x 45cm approx) that has a smooth, shiny surface (hardboard or similar) to use for your heel slide exercises. Wearing socks and sprinkling some talcum powder on the board helps to decrease the friction on the heel as well.
- If you don't have any 1 or 2 kilogram ankle weights for your rehabilitation, try using a double oven glove with a tin in each side over your leg or putting a tin in a sock and then tying two socks together.
- If you don't know where you can use a hydrotherapy or swimming pool, it is worth doing a bit of homework and finding out locations, opening times and cost before your surgery.

If you have any further tips or suggestions to add to this practical advice as you go through your own CCI rehab, please email to: office@kneeclinic.info