

XN-CCK Knee Prosthesis

Surgical Technique

北京市春立正达医疗器械股份有限公司
Beijing Chunlizhengda Medical Instruments Co., Ltd



关注骨科动态
欢迎扫一扫

400-010-1998

声明:

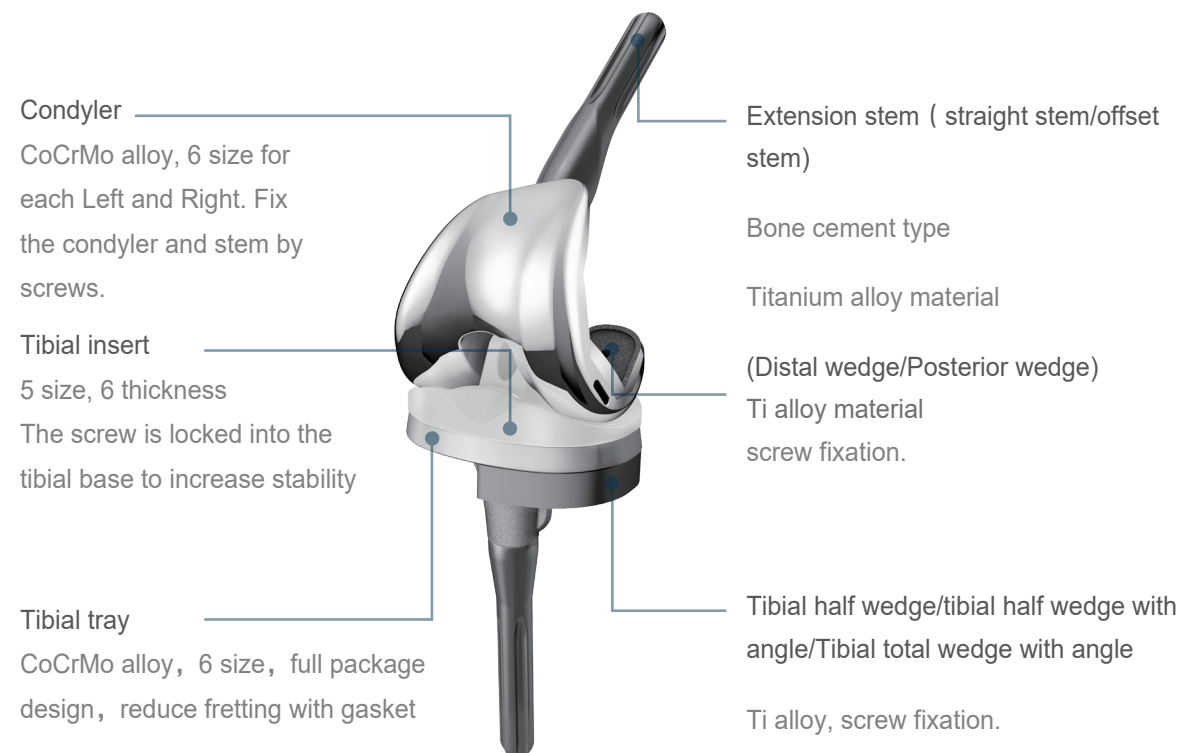
本技术手册所述内容, 供内部人员
参考, 医护人员应根据患者的实际
情况选择最为合适的治疗方案

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I

Introduction



II

Indication

This prosthesis is suitable for severe knee pain and disability due to the following reasons:

- Rheumatoid arthritis, osteoarthritis, traumatic arthritis, multiple arthritis.
- Avascular necrosis of femoral head and condyle.
- After trauma, joint structure lost, especially patellofemoral joint erosion, dysfunction.
- Moderate valgus, varus or flexion deformity.
- Used for revision surgery after total knee arthroplasty.

III

XN-CCK can be used for primary total knee arthroplasty.

Contraindication

Insufficient bone mass on the surface of the femur or tibia

- Neuroarthropathy.
- Osteoporosis or any muscle loss that can endanger the affected limb.
- There was stable and painless arthrodesis in the functional area.
- Severe instability or loss of function of the lateral collateral ligament.

IV.

Operation procedure

01. Remove failure prosthesis

a.

The initial femoral and tibial prostheses were removed, and all bone cement and debris on the bone surface were removed, leaving only high-quality bone.

b.

Check the wear and looseness of the patella. If any one of them occurs, take out the patella prosthesis. If the patellar prosthesis is well fixed and has no wear, confirm whether the design is compatible with xn-cck prosthesis. If the design is compatible, it is best to keep the patella prosthesis in vivo and avoid patella injury. Refer to the contraindications, warnings and precautions in xn-cck package instructions.



Figure 1

Note: the appropriate reamer size should be predicted in the preoperative plan and confirmed when it comes into contact with cortical bone.

Reamer can not be used for final osteotomy, but its tip can reduce the possibility of penetrating the cortical bone of tibia.

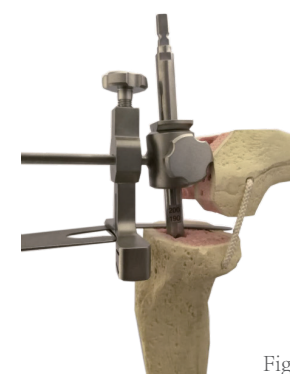


Figure 2

Note: the xn-cck tibial medullary cavity locator has a 5 ° caster angle to cooperate with the xn-cck tibial plateau bracket with a 5 ° caster angle.

02. Determination of tibial prosthesis

a.

After the tibial prosthesis was removed, the bone cement and debris were removed. If necessary, an initial hole can be drilled. Center the 8mm drill (For revision surgery, this hole needs to be located about 15 mm in front of the cortical bone. In revision surgery, the location of medullary cavity should be confirmed by X-ray before operation and by tibial spine during operation. The cutting point of the drill should be above the midpoint of the isthmus of the tibial medullary cavity, not at the midpoint of the proximal tibia. Drill after the bit is placed in the correct position.)

From the 9 mm diameter reamer, gradually increase the size of the tibial medullary cavity drill to ream the tibia until the bone surface completely covers the depth of the reamer teeth. Continue to increase the diameter until the reamer contacts the cortical bone (As shown in Figure 1)

b.

Keep the last reamer in the right position, or take out the reamer, and install the straight extension rod with the same model as the last reamer with the pin connector. The connector of extension rod and medullary pin was implanted into the reamed medullary cavity.

Install a suitable tibial medullary cavity locator on the reamer or pin connector ((see Figure 2)

c.

The standard osteotomy groove on the three kinds of tibial osteotomy plates can be used to cut the tibial plane. Slide the selected tibial osteotomy guide on the tibial medullary cavity locator until it contacts the front of the tibia. Then lock the nut (Fig. 3).



Fig.3

d.

The rotation of tibial osteotomy plate is very important. Adjust the osteotomy guide to cut directly from the front to the back of the tibia. Varus / eversion is equally important. Install the extramedullary force line corrector and lock the nut to check. Then implant the force bar for calibration (as shown in Figure 4).



Fig.4

The tibial osteotomy plate was fixed with pin and osteotomy was performed with pendulum saw.

e.

If there is a defect in the tibia, the appropriate osteotomy line can be directly selected for osteotomy (As shown in Fig. 5, it is one of the three kinds of tibial osteotomy plate, which can cut the defect bone with thickness of 5mm and 10mm on the half side of tibia to increase the cushion block. The other two kinds of tibial osteotomy devices can cut 16 ° semi wedge block and 7 ° full wedge block. If there are no other defects, this step can be omitted.

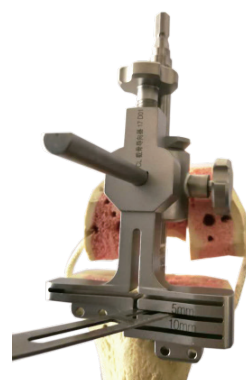


Fig 5

Note: the operation steps shown in Fig. 2 are measured with osteotomy plane measuring instrument. If the tibial plateau is flat and without defect, the operation steps shown in Fig. 3, FIG. 4 and Fig. 5 can be omitted.

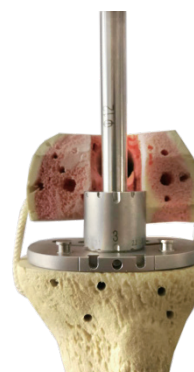


Fig.6



Fig.7

Note: the recorded value is the value on the eccentric guide which is directly opposite to the center of the metal test mold.

03. Complete the tibia part

a.

A suitable type of metal test mold (well covered) was placed on the plane of tibial plateau, and the final reamer or the connector of the medullary pin connecting the extension rod was inserted into the medullary cavity. The straight guide device is installed on the connector of reamer or medullary needle test piece to match with the metal test mold. If the straight guide cannot be placed on the metal test mold, check and determine whether the reamer or the assembly specimen is fully inserted into the pulp cavity.

If the position of the metal trial die is not optimal, remove the straight guide and select the eccentric guide until it enters the ring of the metal trial die (The eccentric guide allows the metal to be offset in any right direction (3mm) until the best covering position is completed (as shown in Figure 6). Record the value of the eccentric guide at this time (see Figure 7)

After the completion of the metal test, remove the eccentric guide, reamer or pin connector, and keep only the metal test mold. Fix the metal test mold with two cap screws.

b.

Install the tibial guide, open the proximal tibial pulp with the tibial limit reamer (as shown in Figure 8), and ream to the marking position

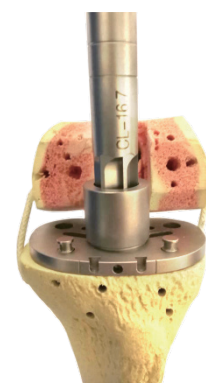


Fig.8

Note: the reamer should ream to the second line

c.

Take out the guide, connect the tibial medullary cavity file head with the handle, and repair the tibial medullary cavity according to the opening of the metal test mold (as shown in Figure 9). Until the file head is completely in contact with the metal test mold.



Fig.9

d.

Take out the tibial medullary cavity file, and check the shape of proximal tibial medullary cavity (see Figure 10)

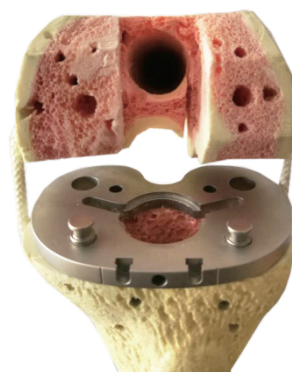


Fig.10

e.

Take out the metal test mold, and install the tibial plateau test piece and the medullary needle test piece. If the eccentric medullary needle test piece is selected, the correct eccentric angle should be aligned with the score on the tibial plateau test bracket, and then put into the tibial medullary cavity (see Figure 11)



Fig.11

Note: when connecting the tibial plateau test bracket with the medullary pin test piece, in addition to the self-contained fastening screw, the nut as shown in the figure can also be used to lock, so as to make the connection more tight, and it is not easy to loose and fall off when taking out.



Fig.12

f.

Check whether the prosthesis and osteotomy surface are suitable and whether the placement position is suitable (If there is an improper gap, remove the tibial component and repair the bone surface until a proper bone contact is obtained.

04. Osteotomy of femur

a.

The femoral intramedullary locator with a certain eversion angle was inserted into the femoral medullary cavity, and the femoral test block (10mm thickness, prevent excessive osteotomy of the distal femur) was inserted between the distal femur and the intramedullary locator, and the distal osteotomy plate was inserted (see Figure 13)

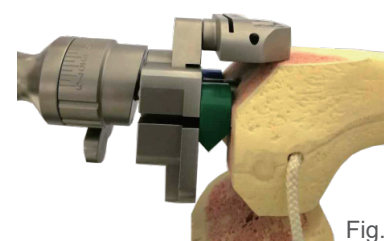


Fig.13

Note: the femoral valgus angle is usually 5 degrees; If the osteotomy plane of distal femur is flat, this step can be omitted.

After the distal osteotomy plate was fixed with a fixed nail, the osteotomy plane of the distal femur was trimmed with a pendulum saw.

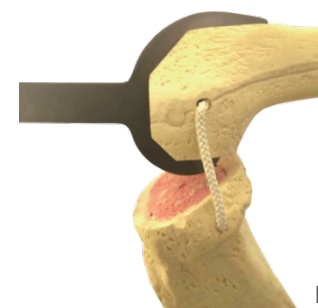


Fig.14

b.

The size of femoral condyle was measured by condyle measurement specimen to select the appropriate size of femoral condyle (As shown in Figure 14) (this size is for reference only)

c.

The reamer was used to open the pulp in order from small to large until the reamer contacted the cortical bone ((see Figure 15)



Fig.15

Note: reamer reams to the second line.

d.

Choose the appropriate size of the femoral cutter (good coverage), and install it on the force line guide. The force line guide is close to the anterior condyle and fixed ((see Figure 16)



Fig.16

e.

Install the deflector. If the straight guide can make the osteotomy device well covered, then proceed to the next step directly, otherwise use the eccentric guide until the osteotomy device is well covered, and record the eccentric reading at this time ((see Figure 17)

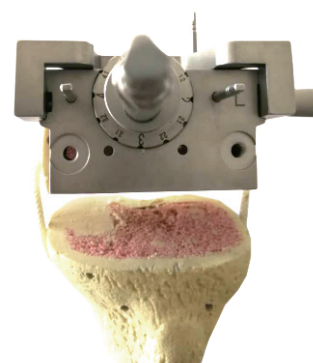


Fig.17

Note: refer to the method of tibial eccentricity adjustment.

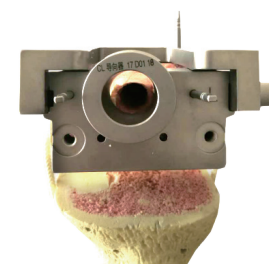


Fig.18

f.

After adjusting the eccentric angle, take out the eccentric guide, install the femoral intramedullary guide (as shown in Figure 18) and ream with the femoral limit reamer (As shown in Figure 19)

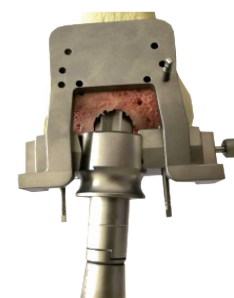


Fig.19

Note: reamer reams to the second limit line.

g.

The posterior condylar osteotomy plate was installed and osteotomy was performed ((see Figure 20)

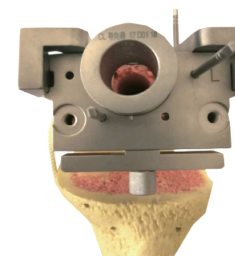


Fig.20

Attention: the collateral ligaments should be protected during osteotomy.

h.

Connect the medullary cavity locator and the medullary needle specimen, select the medullary needle specimen that is consistent with the last reamer or 1 size smaller, and lock it with nuts (straight medullary needle specimen can be directly screwed in without nuts) ((see Figure 21)



Fig.21

Note: if the eccentric medullary needle specimen is selected, the correct eccentric angle should be aligned with the line under the medullary cavity locator, and the "L" and "R" marked below the medullary cavity locator should be noted.

i.

Select the same type of intercondylar osteotomy plate as the determined one, and then install the intramedullary locator connecting the medullary needle specimen on the femoral condyle after matching with the intercondylar osteotomy plate ((see Figure 22)



Fig.22

Note: there is a 5 ° eversion in the medullary cavity locator.

j.

After the osteotomy, the intercondylar osteotomy was checked and the impurities were removed ((see Figure 23)

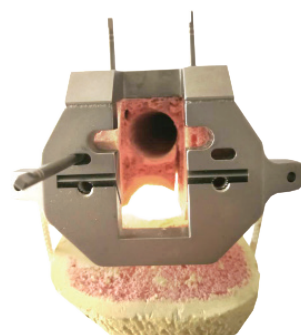


Fig.23

Note: in the process of intercondylar osteotomy, attention should be paid to the soft tissue of posterior condyle.

h.

The femoral condyle and the medullary pin were connected and locked with nuts. If the eccentric nail is selected, the correct eccentric line should be aligned with the line on the test condyle ((see Figure 24)



图24

k.

Install the assembled specimen on the femoral condyle and check whether the intercondylar is installed in the expected position.



Fig.25

Note: osteotomy modules of 5 mm and 10 mm in distal and posterior condyles of femur are provided.

l.

Check the internal and external bone defects, and confirm whether the distal femur and posterior condyle need to be installed with cushion blocks. If there is no need to install the cushion block, the femoral osteotomy is completed; If the cushion block needs to be installed, the swing saw is used for osteotomy ((see Figure 25)

m.

Install the same type of distal femoral test pad and posterior condylar test pad, and check the fit of each osteotomy surface of femoral condyle ((see Figure 26)

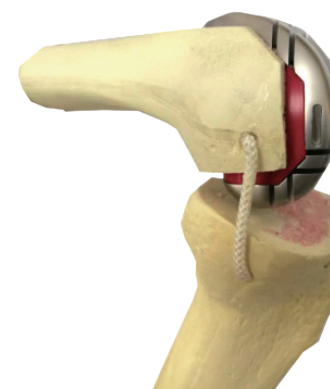


Fig. 6

05. Try to reset

Adjust the gap test pad, test the tightness, check the stability of the joint. The knee flexion position and extension position were tested respectively (Fig. 27, 28).

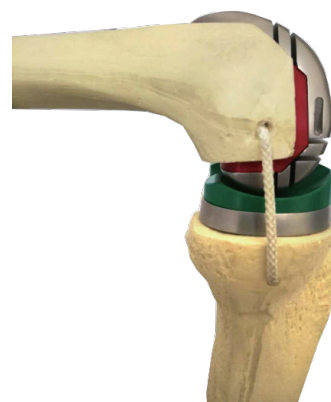


Fig.27

06. Implant prosthesis

a.

The medullary needle and tibial plateau bracket, medullary needle and femoral condyle, cushion block and platform bracket, cushion block and femoral condyle were assembled respectively (cushion block was used when necessary).

b.

The tibial medullary cavity was filled with bone cement, and the tibial plateau bracket was driven into the tibial plateau bracket with a platform bracket impactor to quickly clean up the excess bone cement.



Fig.28

c.

Apply bone cement, connect femoral condyle with condyle holder, align the positioning hole, and press the prosthesis close to the front bone. Install the platform test pad, squeeze the bone cement, straighten the knee joint, and wait for the cement to solidify.

d.

The space and stability of the knee joint were determined. The same type of tibial plateau pad prosthesis was selected and the impactor was used (Pay attention to the angle when impacting).

e.

Apply bone cement to the patella and install the patella prosthesis to ensure that the pins are aligned with the corresponding pin holes. Patellar prosthesis was fixed with patellar forceps. At the same time, the extruded bone cement was removed, and the patellar forceps were removed when the bone cement was solidified.


f.

After the cement has set and all excess cement has been removed, the joint is washed thoroughly. The soft tissue was closed in a normal stratified manner.




Technical parameter


Condylar (Unit: mm)

	2#	3#	4#	5#	6#	7#	pic
AP	54	56	59	62	65	68	
ML	60.5	63	65	67.5	70.5	75	

Tibial insert (Unit: mm)

	2/3/4#	5/6#	7#	pic
AP	45	51	56	
ML	68	75	85	
Thickness	9、11、13、15、17、19			

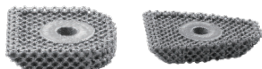
Tibial tray (Unit: mm)

	2#	3#	4#	5#	6#	7#	pic
AP	40	43	45	47	51	53	
ML	61	65	68	70	71	79	


Extension stem (Unit: mm)

	Dia								pic
Straight extension stem (L:60、100、130)	9	10	11	12	13	14	15	16	
Offset extension stem (L:100、130)	9	10	11	12	13	14	15	16	

Femoral wedge (Unit: mm)

	2#	3#	4#	5#	6#	7#两	pic
Posterior wedge	Thickness: 5mm, 10mm						
Distal wedge							

Tibial wedge (Unit: mm)

	2#	3#	4#	5#	6#	7#	pic
Half wedge	Thickness: 5mm,10mm						
Half wedge							
Total wedge							



Disinfection and sterilization

Prosthesis implant

The prosthesis implants described in this manual have been sterilized, so it is unnecessary to disinfect them before operation.

Surgical Instrument

Surgical instruments are not sterilized and must be disinfected before operation in accordance with the laws and regulations of the country, industry norms and the system of the hospital.

VII

The guiding step of rehabilitation training after TKR.

The time of rehabilitation exercise after operation, from the day after operation to half a year after operation, is generally divided into five stages

STAGE 1.

0-2 / 3 days after operation, we only need to rest in bed, or do it. We only need to do foot back stretching exercise, 6-8 hours a day, about 15 minutes per hour.

STAGE 2.

The drainage tube was pulled out 2 / 3 days after the operation, and the stitches were removed and discharged 2 weeks after the operation.

- The patients are only allowed to carry part of the weight, the amount of activity is limited to go to the bathroom every day, and the rest of the time to walk as little as possible.
- CPM exercise: start with knee flexion of 40 ° and increase knee flexion of 10 ° to 120 ° every day.
- There are also five exercises, which can be started 3 days after operation (the second stage). The number and intensity should be gradually increased according to the specific situation, and it is better to reach the intensity and quantity required by the third stage at the time of discharge.

STAGE 3

Discharge to 6 weeks after operation

The first three are to straighten the knee, which is the most important; The last two movements are to practice flexing the knee, which is also very important. The first action: lie on the bed, hook your feet up and raise your legs straight, lasting 10 seconds every day, 100 times a day. The second action: bed side up hook foot lift leg. Each time lasted for 10 seconds, a total of 100 times a day for one leg exercise. The third movement: press the knee joint on the bed and stretch it passively: put the heel up about 5cm, press the knee joint continuously for 3-5 minutes with 3-5kg force or equal weight object each time, 10 times a day. The Fourth Movement: holding the leg in bed, flexing the knee joint, flexing the knee joint to the maximum pain that can be tolerated, lasting for 3-5 minutes a day, a leg a total of 10 times a day. The fifth movement: press the leg on the bedside and bend the knee joint. Flexing the knee joint to the maximum tolerable pain, lasting 3-5 minutes a day, 10 times a day for one leg.

The above five actions can be started 3 days after operation (the second stage). The quantity and intensity in the second stage should be gradually increased according to the specific situation. The above strength and quantity required in the third stage should be reached at the time of discharge.

In the second and third stage of exercise, there must be knee pain, mainly muscle and ligament pain caused by exercise, especially at night, do not need to be too nervous, must be appropriate application of analgesic drugs. It is suggested that two drugs should be used in combination, one is indomethacin suppository, one or half of which should be inserted into the anus every day. Besides analgesic, anti-inflammatory and antipyretic effects, its main function is to prevent knee joint adhesion and heterotopic ossification; The other is oral anti-inflammatory analgesics, such as Celebrex, Votalin, Fenbid and tramadol, which can be used in combination with indomethacin suppository

At 6 weeks after operation, it is suggested to have a reexamination with the operator.

STAGE IV

6 weeks to 3 months after operation

The training method is still the five movements in the third stage, and the intensity and quantity are the same as those in the third stage. In this stage, you can throw crutches and walk on the ground. The affected limb can bear the weight completely, and you can pay attention to the appropriate amount of activity.

The operator must be rechecked 3 months after operation. If the function recovery is not good, there is also a chance to get good function by Manual massage. Otherwise, there will be no chance in more than four months.

STAGE V

From 3 months to 6 months after operation

The training method is still the five movements in the third stage, and the intensity and quantity can be appropriately reduced, preferably not less than half of the third and fourth stages. The purpose is to maintain and consolidate the rehabilitation effect. Otherwise, the rehabilitation effect will regress 6 months after the operation, and the above rehabilitation effect will remain stable until the end of life, Therefore, there is no need for systematic rehabilitation training.

Wish all patients and friends a speedy recovery