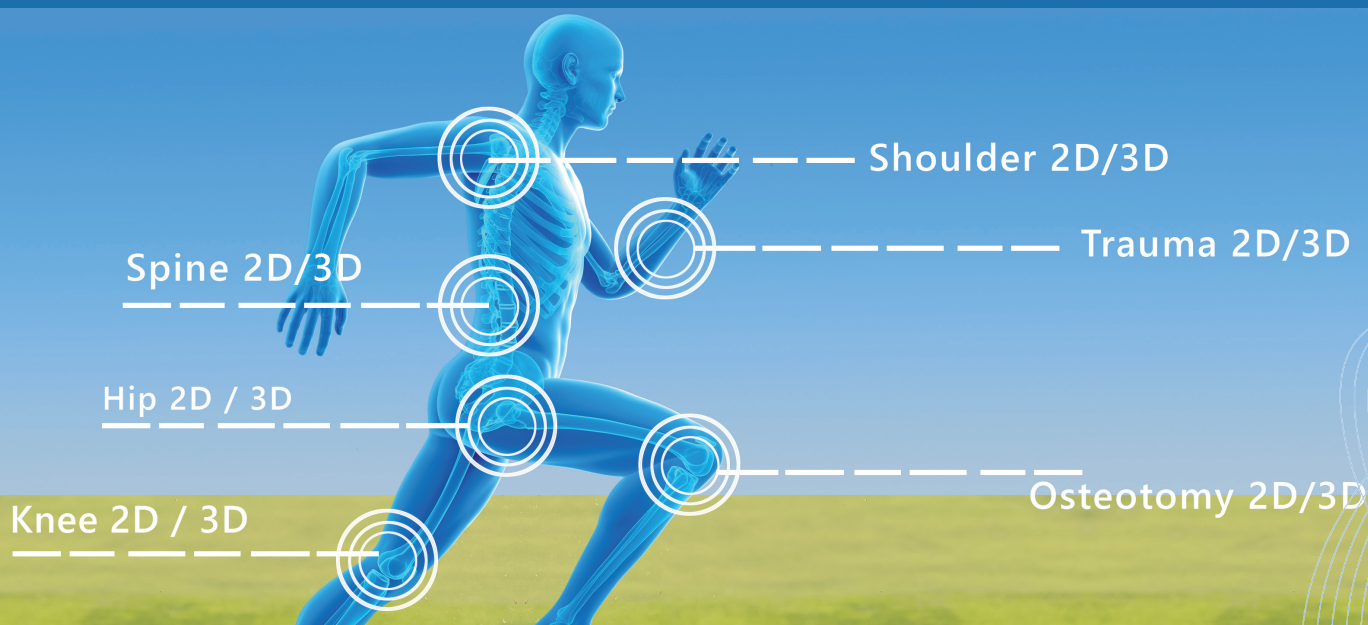


mediCAD[®]

Image Requirements and Scaling

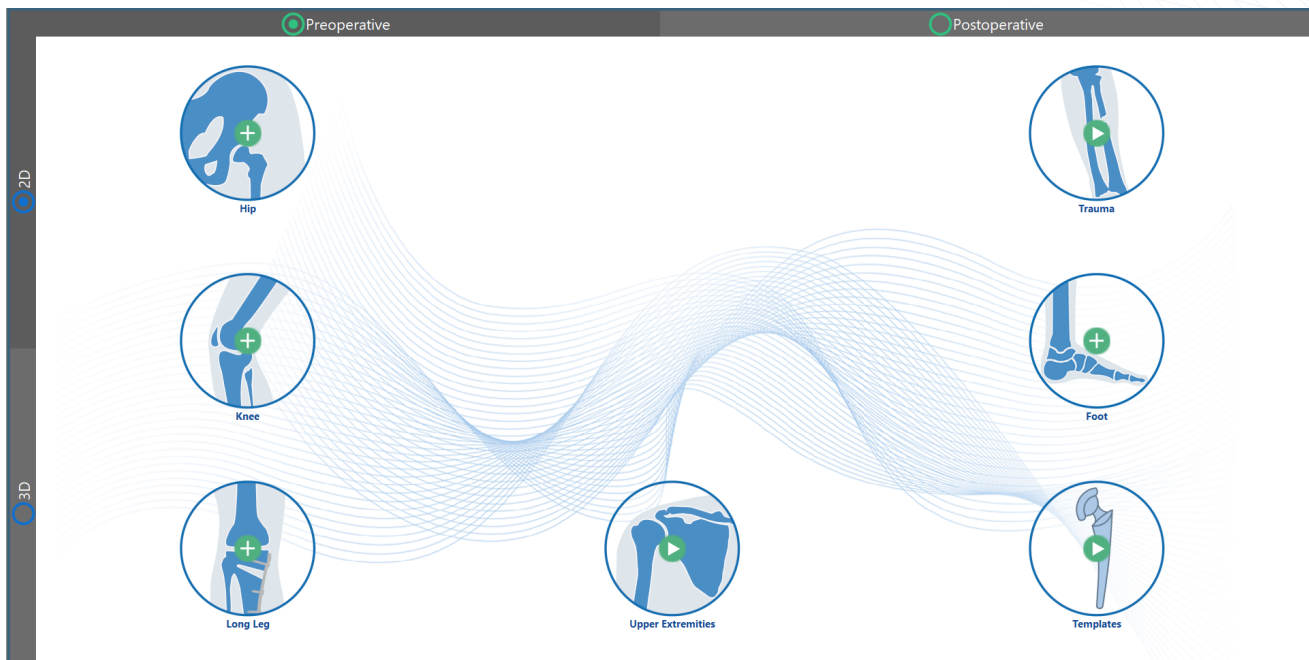


mediCAD[®]

The Orthopedic Solution

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In accordance with regulation (EU) dated 5th April 2017, the software described here is CE compliant in accordance with the MDR Annex V and classified as Class IIa medical device in accordance with Rule 11 of Annex VIII.

mediCAD Classic version 4.0: Cleared for the US market by the FDA (FDA 510(k) K170702).
mediCAD version 5.1 to mediCAD version 6.8 updated by letter to file under (FDA 510(k) K170702).

 **Manufacturer:**
mediCAD Hectec GmbH
Opalstrasse 54
84032 Altdorf
Germany

mediCAD US, Inc.
191 Peachtree St NE, Suite 3720
Atlanta, GA 30303
USA

CE 0483

Caution (US only): Federal law restricts this device to sale by or on the order of a (licensed healthcare practitioner).

Product: mediCAD[®] – Orthopedic Planning Software
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The functionality of mediCAD described herein doesn't claim to be complete. If you are missing clinically relevant functions and calculations or if you find any errors, we would appreciate being informed. Please contact the mediCAD Hectec GmbH at: Phone +49 871 330 203-0, Fax +49 871 330 203-99 or via email to support@hectec.eu.



WARNING

Please pay attention to these instructions at all times! The used reference object has to be disinfected before and after usage with a disinfectant appropriate for stainless steel.



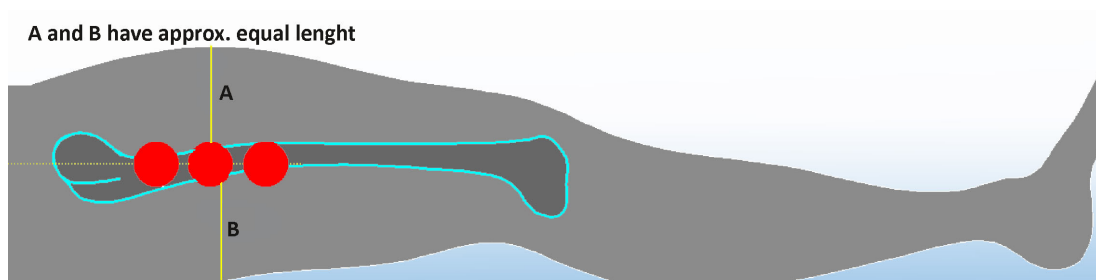
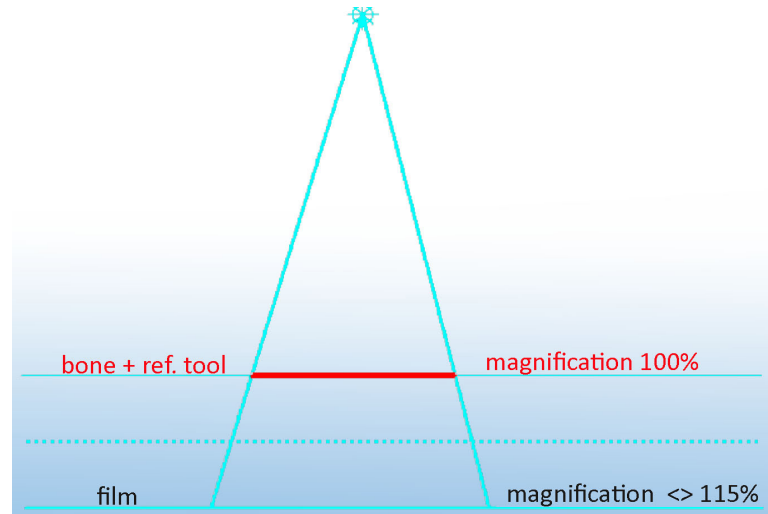
CAUTION

In order to avoid errors that might occur during automatic scaling, we recommend not to use round x-ray markers.
mediCAD[®] supports automatic sphere detection. To ensure automatic detection works properly, make sure the x-ray images are of high contrast.

In order to obtain ideal results when planning prostheses and osteotomies, the following requirements have to be met:

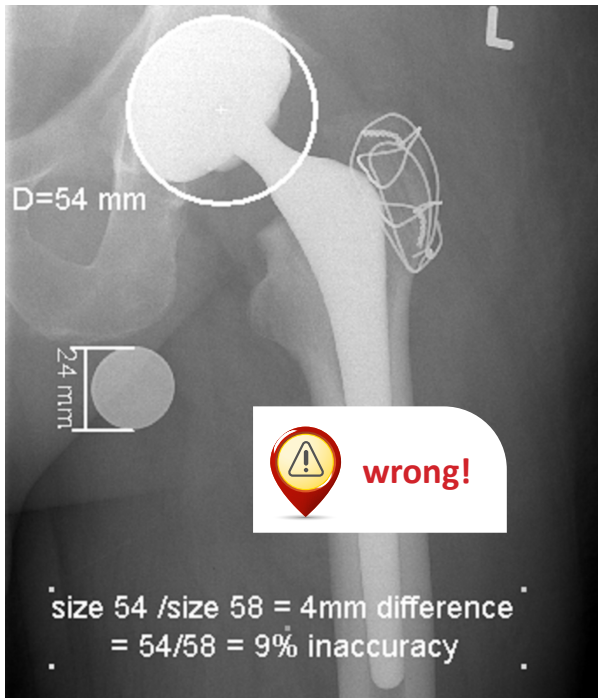
- All images must be recorded in accordance with orthopedic criteria. They are described in reference literature such as Bernau, Bohndorf: Röntgendiagnostik in Orthopädie und Traumatologie and partially used on the following pages.
- Images must be of high quality, the reference object (for scaling) as well as the area of interest must be clearly and fully visible.
- Place the reference object (e.g. sphere, scale bar) close to and at the level of the joint/bone area you are interested in to get results as accurate as possible.

The most accurate result is achieved if reference object is placed as shown below.



CAUTION

For a hip planning, we recommend to place the sphere medial or lateral close to and at the level of the joint. For long leg planning (knee prostheses and corrective osteotomies), place the sphere medial or lateral at the level of the knee joint or the longitudinal femur axis.



If you place the reference object upon the skin, as shown in the next image, the result must and will be inaccurate. About 5-10% or 1-3 sizes of the prosthesis are to be expected.

A cup size 58 mm was implanted, despite the expected cup size of 54 mm after scaling with a 24 mm scaling sphere.

The error was caused by positioning the scaling sphere above the femur bone level.

- The measures of the applied reference objects in mm must be known. Wrong input can lead to serious miscalculation. The original mediCAD[®] sphere has a 25 mm diameter with a +/- 0,1 mm tolerance. When using other reference objects, measure and tolerance of the respective manufacturer apply.
- Reference objects must not be too small. We recommend a sphere diameter of ≥ 20 mm and scalingbars of ≥ 50 mm length.
- Scale bars or any angular/oblong reference objects must be placed parallel to the film to avoid projection errors.
- Reference objects must have a clearly visible outline on the x-ray images. Avoid scatter.
- Enlarge the reference object on the screen before scaling.

User suggestions:

- Size and position of reference object should be documented.
- Film/focus distance, film/reference object distance and film/bone-of-interest distance should be documented. Instead of the film, the desk can be used as the second level.

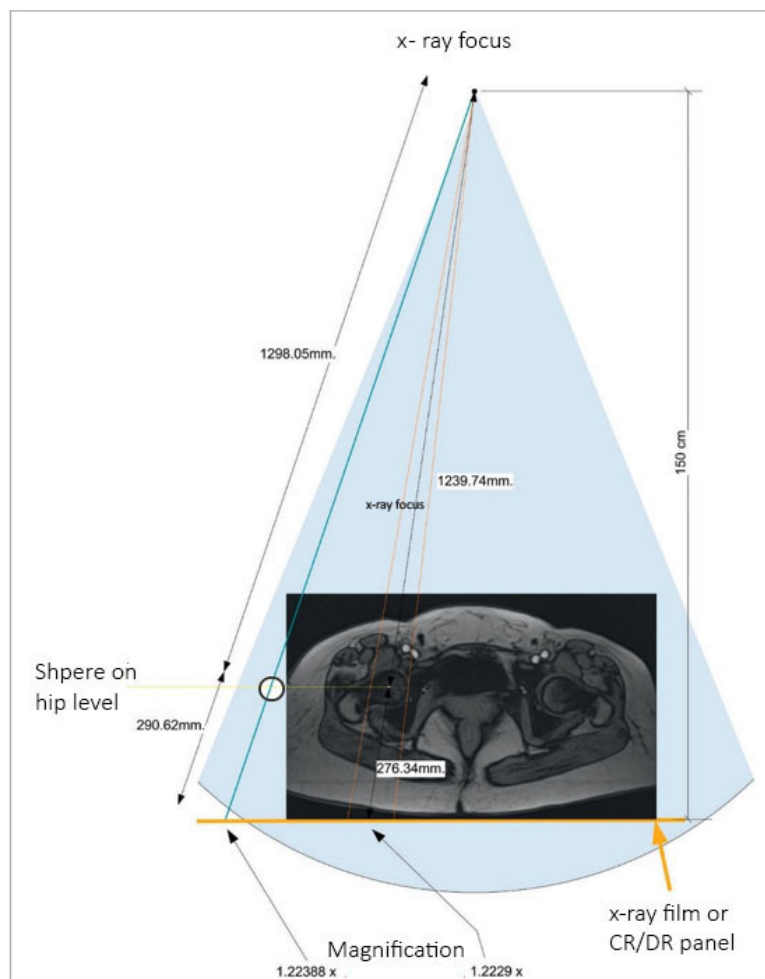
Sources of error:

- Reference object is too small. The smaller the reference object, the larger the measuring error.
- Reference object is not placed parallel to film/table. The larger the angle, the larger the error.
- Reference object wasn't enlarged before scaling. The larger the number of x-ray pixels displayed on one screen pixel, the larger the error. Enlarging/zooming increases the visible screen pixels as well as the visibility of bone structures.

The illustration shows an example of a frequently made x-ray of the hip/pelvis. The x-ray source is a point source and radiates in a spherical way, as shown in the illustration. The x-ray image however is recorded on a plane DR or CR detector plate. This causes an elliptical projection of the scaling sphere.

A precise dimension can therefore be only determined for the exact position of the scaling sphere. With increasing distance it becomes less accurate. Hence the sphere should always be placed as close as possible to the joint you want to work with and fixated exactly on the level of the joint. Our scaling tools (adhesive pads, scaling stand with flexible arm and integrated scaling sphere) are well suited for this task.

In the depicted example, the relatively small distance to the actual hip joint only causes a minimal deviation of less than 0.5% – when used correctly, this allows for precise scaling.



Compared to other scaling methods, **mediCAD**[®] is well positioned: scaling methods, which for example don't determine the exact bone level but identify the distance between multiple scaling markers and then scale using statistical values (values which have been repeatedly adjusted over the last few years), are certainly not more or less precise.

The automatic scaling using a scaling sphere provides a highly convenient, simple, and uncomplicated handling and when used properly, a precise scaling as the basis of as exact a preoperative planning as possible. When using a known magnification factor for scaling, it is required that the imaging system automatically saves a reference measurement (Pixel/Spacing). The level of the reference measurement (table/panel) may differ depending on the system used. When using a scaling bar with a known length, it is important to place the scaling bar parallel to the x-ray table, otherwise errors might occur due to distortion.

The following information contains partial texts extracted and translated from Bernau, Bohndorf: Röntgendiagnostik in Orthopädie und Traumatologie drawings/outlines from/based on Wicke: Atlas of Radiologic Anatomy.

Hip Modules

Place the reference object close to and at the level of the hip joint, near the palpable greater trochanter (Trochanter Major) or at the level of the lesser trochanter (Trochanter Minor) or below at the level of the femur shaft.

The basic requirements for planning a surgical procedure are x-rays taken according to the following criteria:

- Symmetrical positioning of the pelvis
- Hip joints in neutral position
- Longitudinal femur axis parallel to the image receptor plane
- Patella in zero position
- Central ray beam on femoral head center symphysis



WARNING

When taking the x-ray, pay attention to avoid oblique positioning, abduction or external leg rotation. Otherwise you won't be able to determine the optimal rotation center of the endoprosthesis accurately.

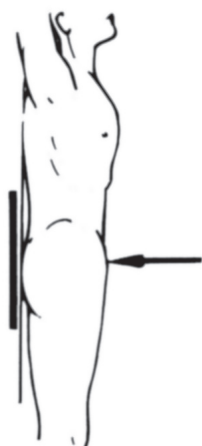
NOTES

For the **Hip - Biometry** module, the iliac crest must be visible in order to exactly define the 10 biometric points.

For the **Hip - Wear Measurement** module, only almost identical images can be compared to each other: the position of the hip endoprosthesis should be similar, if possible. Views must be the same on both images (AP and AP, ML and ML, etc.). The chronological distance between the images should be as much as possible (wear increases the more time has passed).

For the **Hip - Coxometry** module, in order to determine the development of the acetabulum (e.g. AC-HILG, ACE), the pelvis must not be in a lordotic position (flexion of hip and knee joints) and the patella must be in zero position. In order to determine the situation of the femur head, femoral neck and femur, (e.g. CCD angle), the patient must be positioned in such a way that the longitudinal axis of the femur is parallel to the image receptor plane. The hip joints must be in a neutral position and the patellae in zero position.

For the **Hip - FAI** module, you can use the following types of images: pelvis overview (anterior-posterior), false profile ("faux" profile) image (axis between femoral head and scaling sphere must be parallel to the image receptor plane!), axial x-rays (e.g. cross-table or Rippstein), Lauenstein image.

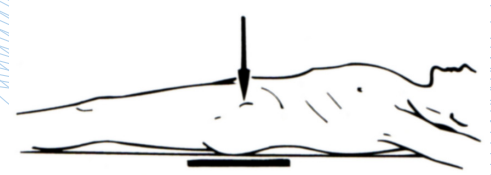


Pelvis overview, standing:

The patient's back is to the stand, knee joints stretched, kneecaps frontalized. As a rule, the feet are pronated in a way that the big toes are touching each other. A possible malposition of the hip joint shall not be necessarily avoided, instead keep it while recording the x-ray in order to document the pathological clinical result radiologically. Use compression device for adipose patients.

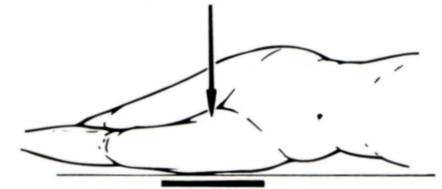
Hip anterior-posterior (standing or lying):

Standing in front of the bucky wall stand (patient stands with frontalized knee caps, which means having slightly pronated feet, in front of the bucky wall stand, while holding on to the stand with his hands) or lying on the bucky table (supine position), stretched legs, frontalized knee caps, beam alignment on groin center.



Hip joint lateral according to Lauenstein:

Patient on the bucky table in supine position, rotated so far to the side, that hip joint to be recorded is centrally placed in 45° flexion and 45° abduction. If abduction is constrained by pain, elevate the opposite hip accordingly.



Upper leg with hip joint, anterior-posterior:

Supine position, stretched legs, frontalized knee caps, sandbag on lower leg, opposite leg slightly abducted.



Upper leg with hip joint, lateral:

Inclined position on the bucky table. The exterior side of the upper leg to be recorded lies lateral on the bucky table, with a 70° hip flexion and a 90° knee flexion. Sandbag on lower leg if necessary. The opposite leg is overstretched if possible and placed dorsally behind the leg to be recorded.



Pelvis overview, lying, hanging lower legs (Rippstein 1):

By placing the lower legs in vertical position, a defined rotation of the proximal femur edge is insured. This is particularly relevant in regard to repeated x-rays (e.g. pre and post operative). As the projected femoral neck angle is changing in correlation to the flexion of the hip, the flexion should be 0°, meaning, the hip joint shall be fully stretched.

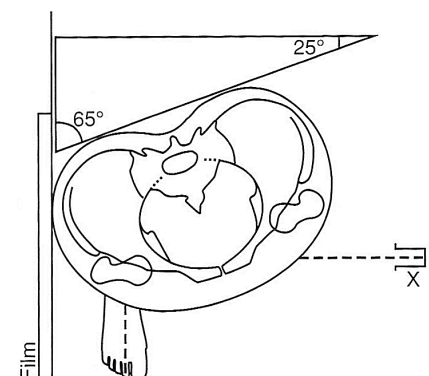
Hip joint, antetorsion image (Rippstein 2)

This special orthopedic image is preferential in regard to the antetorsion angle in case of a child, but also of importance for the objectivization of rotation errors after a femoral fractures. The projected antetorsion angle of the femoral neck is determined. Position on the leg holding device according to Rippstein, right-angled flexion of hip and knee joints, 20° abduction of both upper thighs. Usable images are only obtained by exactly abiding the angles mentioned above.

Hip joint, inclined – “faux profile” according to Lequesne

Patient is standing with the back diagonally to the bucky wall stand, in an angle of 65° between back and stand plane. The foot closer to the stand stays parallel to the image receptor plane (axis through metatarsal II) in order to achieve an actual lateral image.

In case of an excessive torsional malposition, where the foot is rotated outward by more than 15° while the patella is pointing forward, use the patella as the point of reference. The knee must be parallel, i.e. the patella perpendicular to the bucky wall stand.



Knee and Osteotomy (Long Leg) Modules

When using the **Knee and Osteotomy/Osteotomy by Dror Paley** modules, you can use partial images as well as long leg images in a standing position and anterior-posterior view. You can compile a full long leg image out of the respective partial images.

WARNING

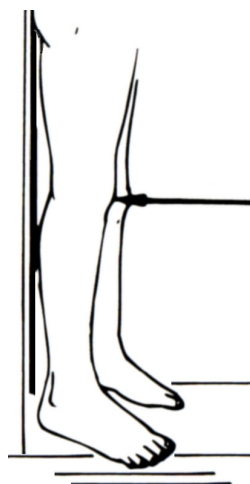


You can calculate axial misalignment correctly only if the images used for planning fulfill the following requirements:

- AP image showing one or both legs, taken in standing position with equal weight distribution on both legs
- Hip and ankle joints must be fully visible
- Reference object placed on longitudinal femur axis level

Due to missing hip and ankle joint centers, partial knee images should be only used as an exception. As the center line and the mechanical axes cannot be determined properly, partial images are not suitable for conducting proper Osteotomy.

Long leg anterior-posterior:



A stable, preferably variable stool construction, allowing safe entering/leaving, is a necessary requirement for all those x-ray systems, where space doesn't allow images with the x-ray tube on knee level with a 2 m FFA minimum to be taken.

Patient standing with the back to the stand, holding on to the stand with both hands behind his back. Knee cap parallel to the film, frontalized. If possible, take image standing on one leg only, whilst heel of the other leg is held against lower thigh of the standing leg and is shown on the image as well.

If standing on one leg isn't possible, the skin of the inner ankles respectively knees should just about touch. The leg axes mustn't be affected by pressure from the other leg. When standing on both legs, both knees should be on the same level, a leg length difference is to be compensated with a pad/small board. The recording succeeds up until a body size of 190 cm when using a 96 cm cartridge and proper adjustment of hip and ankle joints.

Upper leg with knee joint, lateral:

Lateral position on the bucky table. The exterior side of the upper leg to be recorded lies lateral on the bucky table, with hip and knee flexion, knee cap perpendicular to bottom layer, sandbag on lower leg if necessary. The opposite leg is placed heavily bent in front of the leg to be recorded.



Knee joint anterior-posterior, lying:

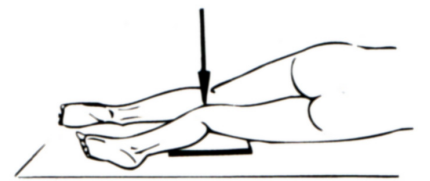
Supine position, stretched legs, frontalized knee caps, sandbag on lower legs if necessary.

Knee joint anterior-posterior, standing on one leg:

Patient standing with the back to the stand. If stand cannot be adjusted to knee level, patient stands on a safe footstool. Knee joint stretched, leg pronated so far, that knee cap is frontalized = parallel to the film.

Knee joint lateral, lying:

Lateral position, exterior side of the knee joint lies proximal to the film, knee joint in 30° flexion. The flexion angle is significant for assessing the height position of the kneecap. The other leg is rested on foam support in front of the leg to be recorded. Knee cap perpendicular to bottom layer; easier to adjust: Lower leg parallel to bottom layer. Elevated heel, rest on foam support.



Lower leg with ankle joint, anterior-posterior:

If possible: Recorded while standing. Patient standing in front of the bucky wall stand, recorded similar to knee joint anterior-posterior standing, however with a lower beam alignment according to the issue.

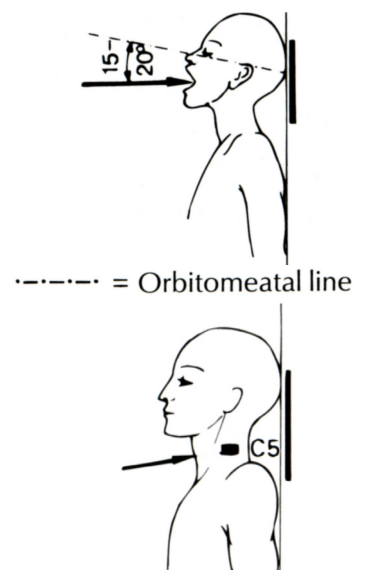
Lower leg with ankle joint, lateral:

Lateral position on the bucky table, knee joint in 30° flexion. Exterior side of the lower leg lies lateral on the cartridge, ankle joint in a right angle position. Exact lateral placement of knee and lower leg, elevate heel and rest on foam support. The opposite leg is placed to the front.

Spine Module

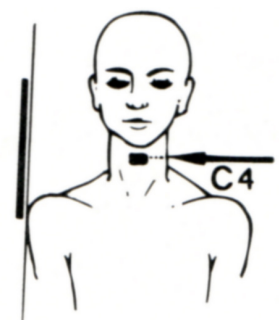
Cervical spine anterior-posterior, sitting:

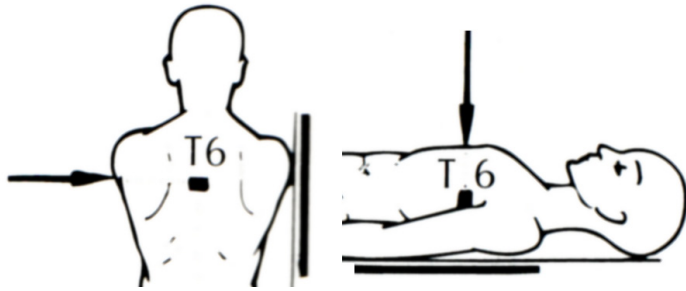
Patient is seated in an upright position with the back to the stand. Head inclination guided by assistant in such a way, that the connecting line between lower edge occiput and upper jaw occlusal plane is perpendicular to the film plane. This adjustment is crucial for recording the 1. cervical vertebra without any overlays. The patient opens and closes the mouth on command of the assistant, "open – close, open – close ...", just by moving the lower jaw and keeping the head absolutely still. In order to avoid the head moving to the back, a 15° foam support is pushed with the head to the stand. With an exposure time long enough (e.g. 400 mAs), the lower jaw is blurred on the image and all cervical vertebrae are depicted suitable for further evaluation.



Cervical spine lateral, sitting:

Patient is seated in an upright position ("swan's neck") with the right shoulder to the stand. Median plane (nose!) exactly parallel to the film. Head rest fixation if necessary. Patient is prompted to focus on a point at eye level (e.g. a postcard stuck to the wall in the required position). This assures a neutral, repeatable posture of the head. Sandbags in both hands in order to pull shoulders as far down as possible, achieving a free exposition of the cervical-thoracic junction. Alternatively: if sitting is impossible, record in supine position, placement according to skull lateral. Fixate small children, as described in position 1 and 3, with a lead blanket, keeping the arms free. Parents pull arms down while recording.





Thoracic spine anterior-posterior, standing:

Patient standing with the back to the stand, hanging arms, stretched legs, standard position, especially during growth. Alternatively, recording in supine position (only with injured and patients unable to stand)

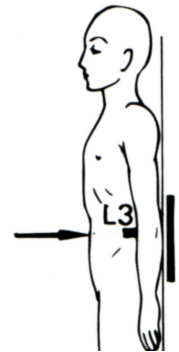
Thoracic spine lateral, standing:

Patient standing with the right shoulder to the stand. Shoulders shall be brought as much forward as possible,

in order to reduce overlays of the upper spine by shoulder blades and tissue without causing an unnatural spine posture. It has proven the most, if the patient encompasses a coat hanger attached to the stand from below or rests the arms on the head rest holder. Alternatively: for patients unable to stand, record in lying position.

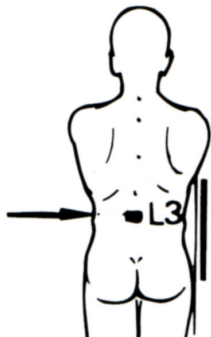
Lumbar spine anterior-posterior, standing:

Patient standing with the back to the stand, arms hanging, legs stretched. If due to a heavy leg length difference the patient is unable to stretch both legs and put down both feet in a plantigrade position, compensate with pad/small board and expose info about the applied compensation onto the film. Use a compression device for adipose patients in order to avoid scattered x-rays.



Lumbar spine, lateral, standing:

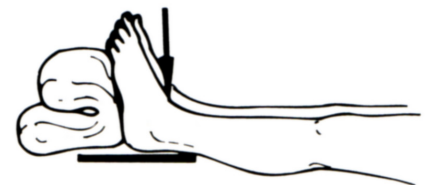
Standing with the right shoulder to the stand, arms resting in front. Alternatively, lying position for injured patients and patients unable to stand.



Foot Module

Ankle joint anterior-posterior, lying:

Supine position, legs stretched with frontalized knee cap and right angle position of ankle joint. Foot is pronated approx. 15°.



Ankle joint lateral, lying:

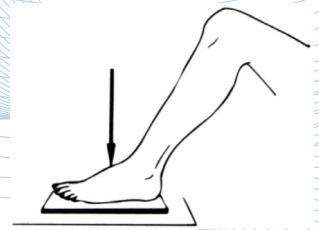
Lateral position, right angle position of ankle joint, exterior ankle joint proximal to the cartridge. In order to achieve a clean lateral image, the malleoli must be exactly on top of each other and the forefoot slightly elevated with foam support.

Foot full image dorso-plantar, standing:

Patient standing with one foot on the cartridge, which is placed on the ground. To avoid changing the foot position, fixate foot on the cartridge using a patch. The other foot is stepping backward behind the one placed on the cartridge.

Foot full image dorso-plantar, sitting:

Patient sitting on the x-ray table, hip and knee joints on the same side in flexion, standing on the cartridge with the sole of the foot.



Foot lateral, standing:

Patient standing on a safe footstool in front of the bucky wall stand. Place a small board under the foot, so the cartridge is standing lower, meaning on the footstool between foot and stand. This ensures a complete depiction of the foot and plantar tissue. Patient is holding on to the stand and lifts the healthy foot.

Foot dorso-plantar, inclined:

Patient sitting on the x-ray table, hip and ankle joints in flexion. Foot standing on the cartridge. Inner side of lower leg (tibial) is placed in a 45° angle against the x-ray table plate on foam support. This way, while holding the upper ankle joint in neutral position, the foot's exterior side is lifted in a 45° angle from the cartridge, with the big toe proximal to the film. In this image, midfoot bones and joint fissures of the toes are visible more clearly.

Big toe dorso-plantar, sitting:

Patient sitting on x-ray table, hip and knee joints on the same side in flexion, big toe flat on the cartridge.

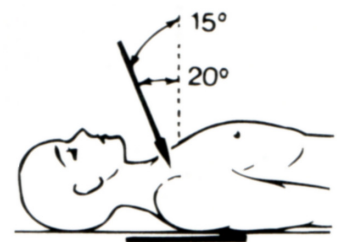
Big toe lateral, lying:

Patient in lateral position in a way, that big toe is lying medial and strictly lateral on the cartridge. Toes 2 to 5 are held in dorsal direction by textile bands by either the patient, or (often easier) tucked between small bars.

Upper Extremities Module

Shoulder anterior-posterior:

For practical reasons, especially because of better repeatability, this recording is taken lying flat on the back. The arms are lying flat on the side of the body, with the palms to the upper leg, i.e. the thumbs are showing up.



Shoulder joint anterior-posterior in 90° abduction and external rotation:

Patient standing at the stand, shoulder blade flat lying, upper arm elevated in a 90° angle with maximal external rotation and 90° flexion of the cubital joint. The position is easier to keep for the patient, if the hand can hold on to something, e.g. a drip stand.

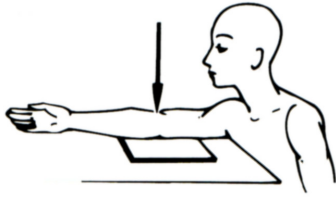
Upper arm anterior-posterior:

Patient standing with the back to the stand, upper arm flat lying. In order to achieve the proper torsion of the upper arm, the elbow is slightly bent and the lateral axis of the cubital joint is set parallel to the film. The position with hanging arms is easier to hold especially for older patients, than the position with an abducted upper arm.

Upper arm lateral:

Patient standing with the back to the stand, upper arm flat lying, upper arm abducted in a 90° angle and in exterior rotation, so when the elbow is bent, the lower arm is lying flat onto the stand. This position is easier to keep for the patient, if the hand can hold on to something (e.g. a drip stand).

Cubital joint anterior-posterior:



Patient sitting sideways at the bucky table. In order to place the arm parallel onto the cartridge, the arm may have to be placed higher or the patient seated lower. Shoulder and cubital joint as well as wrist have to be on the same level. The stretched cubital joint is dorsal on the cartridge, the hand is supined, i.e. palm shows up. Alternatively, if cubital joint can't be stretched (= bending contracture), a separate image must be recorded with each the upper arm and the lower arm for a precise joint assessment.

Cubital joint lateral:

Patient sitting sideways at the bucky table. Like for the anterior-posterior image, shoulder and cubital joint as well as wrist are on the same level. The cubital joint is in a 90° flexion and lies medial on the cartridge center, wrist is held lateral, i.e. thumb shows up.



Lower arm anterior-posterior:

Patient sitting sideways at the bucky table, so that shoulder and cubital joint as well as wrist are on the same level. The lower arm lies flat dorsal on the cartridge. The position will be easier to keep for children, if the arm is fixated under a acrylic plate, weighed down on both ends.

Lower arm lateral:

Patient sitting sideways (radiation protection) at the bucky table in a way, so that shoulder and cubital joint as well as wrist are on the same level. The lower arm lies flat ulnar on the cartridge (thumb shows up), while the cubital joint is in 90° flexion.

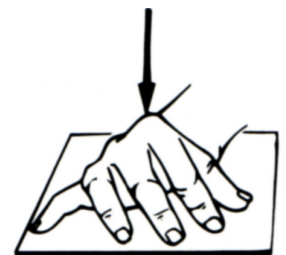


Hand dorso-palmar:

Patient sitting sideways at the bucky table, lower arm lying on it. Hand is palmar flat on the cartridge, with slightly spread fingers in natural posture. The third finger is placed in extension of the longitudinal lower arm axis. Possible malalignments, e.g. an ulnar deviation of the fingers due to rheumatoid arthritis, shall not be corrected but also depicted radiologically.

Hand lateral (inclined):

Patient sitting sideways at the bucky table, lower arm lying on it. Hand is radial slightly elevated (approx. 30°), thumb and index finger placed on foam support in a way, that fingers 2 to 5 including their metacarpal bones are shown inclined, but don't quite overlap („zither player position”).

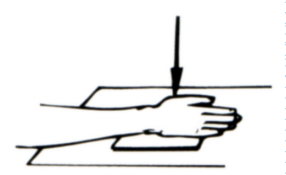


Wrist dorso-palmar:

Patient sitting sideways at the bucky table. Hand is placed on cartridge and foam support in a way, that shoulder and cubital joint as well as wrist are on the same level. Wrist is in neutral position between pronation and supination. In the neutral position, the third metacarpal must be an exact extension of the radial axis and completely shown.

Wrist lateral:

Patient sitting sideways at the bucky table, hand is placed strictly sideways and fully stretched on the cartridge, in neutral position between pronation and supination, with the help of a dorsal placed small board/pad. When setting correctly, the balls of thumb and little finger are on the same level perpendicular to the film.



Thumb palmo-dorsal:

Patient sitting low at (e.g. on a footstool) or kneeling with the back to the bucky table. Arm held backwards on the bucky table, lower arm pronated, so that back of the thumb including the first metacarpal rest flat onto the cartridge center, sandbag over lower arm if necessary.

Thumb lateral:

Patient sitting low at the bucky table, e.g. on a footstool. Lower arm lying palmar on it. The exact lateral adjustment of the thumb succeeds easier if fingers are placed on a small foam support.

Fingers 2 to 5 dorso-palmar:

Patient sitting sideways at the bucky table, fingers individually, flat and stretched, palmar on cartridge center. The other fingers are abducted, sandbag over wrist if necessary. In case of bending contracture, fingers are placed with the dorsal side onto the cartridge, laying on middle phalanx if possible.

Fingers 2 to 5 lateral:

Patient sitting sideways at the bucky table, hand lays strictly lateral on the cartridge. To allow for a recording proximal to the film, lay on the radial side of the hand for fingers 2 and 3, or the ulnar side of the hand for fingers 4 and 5. The finger to be recorded is stretched, all other fingers are bend. As this position can't be held deliberately, especially for fingers 3 and 4, appropriate aids are necessary.

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Traumatologie
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Icon Learning Systems, Teterboro/NJ, 2004


Further Reference


Please refer to the following manuals for further information:


T.E. Keats, C. Siström, Mosby
Atlas of Radiological Measurements
Elsevier 2001, ISBN 0-323-00161-0


A. Coussement, C. Fauré, N. Coussement-Beylard
Repères et mesures en imagerie Médicale
Expansion Scientifique Française 1990,
ISBN 2-7046-1315-X

CT- Scan Guidelines – Long leg torsion measurement

Key scan parameters for the radiologist		Information for image details (FOV)	
Topogramm			
mA	60		
kV	120		
Scantime	0.0 s		
Slice	0,6 mm		
Topogramm length	1024 mm		
X-Ray Position	<input checked="" type="checkbox"/> Top <input type="checkbox"/> Bottom <input type="checkbox"/> Lateral		
Table: Caudocranial	Position: 905.0 Höhe: 490.5		

Hip				
Eff. mA	210			
kV	120			
CTDIvoll (32 cm)	14.5 mGy			
DLP	185.4 mGy cm			
Scantime	2.59 s			Delay: 2 s
Slice	3.0 mm			Akq. 128 x 0.6 mm
Image Count / Tilt	37			0.0°
Start Area	1029.0			
Table: Craniocaudal	Position: 905.0 Height: 490.5			

Knee				
Eff. mA	90			
kV	120			
CTDIvoll (32 cm)	6.07 mGy			
DLP	69.8 mGy cm			
Scantime	4.66 s			Delay: 2 s
Slice	2.0 mm			Akq. 128 x 0.6 mm
Image Count / Tilt	48			0.0°
Start Area	1035.0			
Table: Craniocaudal	Position: 905.0 Height: 490.5			

Ankle Joint				
Eff. mA	90			
kV	120			
CTDIvoll (32 cm)	6.07 mGy			
DLP	69.8 mGy cm			
Scantime	4.85 s			Delay: 2 s
Slice	2.0 mm			Akq. 128 x 0.6 mm
Image Count / Tilt	51			0.0°
Start Area	1607.0			
Table: Craniocaudal	Position: 905.0 Height: 490.5			

References to scale and Accessories

Purpose of the calibration sphere

The calibration sphere serves as reference object to scale the x-ray images.

The calibration spheres are made out of stainless steel. The hollow sphere achieves a substantial weight reduction compared with commercial solid steel spheres. Simple cleaning of the sphere is ensured because of the Smooth surface.

To get results as accurate as possible the sphere has to be placed on bone level. To place the sphere at the patient easily, we offer special one-way adhesive pads.



Article	mediCAD® User Ref.-Number	User of other Systems Ref.-Number
Reference marker set 25mm 1 x calibration sphere	110061	110061-1
Reference marker set 25mm 5 x calibration sphere	110062	110062-1
Reference marker set 25mm 1 x calibration sphere and 10 x one-way adhesive pads	110053	110053-1
Reference marker set 25mm 5 x calibration sphere and 50 x one-way adhesive pads	110063	110063-1
One-way adhesive pads 100 100 x one-way adhesive pads	110055	110055-1
One-way adhesive pads 500 500 x one-way adhesive pads	110064	110064-1

With both models of our scaling stands we can offer two easy to handle options to place a scaling reference on your x-ray images.

- flexible arm for an exact placement
- variable length
- 25mm scaling sphere integrated to the front end
- accurate placement on bone level
- large base plate for the placement on plan surfaces
- clamp for all x-rays in a standing position



Article	mediCAD® User Ref.-Number	User of other Systems Ref.-Number
Stand 25mm with Table Table with a flexible gooseneck (60 cm) for positioning	110059	110059-1
Long Version (100 cm)	110059-L	110059-1-L
Stand 25mm with Clamp Clamp with gooseneck (60 cm) for positioning	110060	110060-1
Long Version (100 cm)	110060-L	110060-1-L

mediCAD®

The Orthopedic Solution



mediCAD Hectec GmbH

Opalstr. 54, 84032 Altdorf - GERMANY

Tel. +49 871 330 203-0

Fax +49 871 330 203-99

info@mediCAD.eu – www.mediCAD.eu

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