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Intra-Articular Polyacrylamide Hydrogel Injections Decreases Pain and Increases Function in Knee Osteoarthritis

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- Knee osteoarthritis (**KOA**) is a disabling disease, and intra-articular (**IA**) polyacrylamide hydrogel (**PAAG**) injections may **decrease pain** and **increase function**.

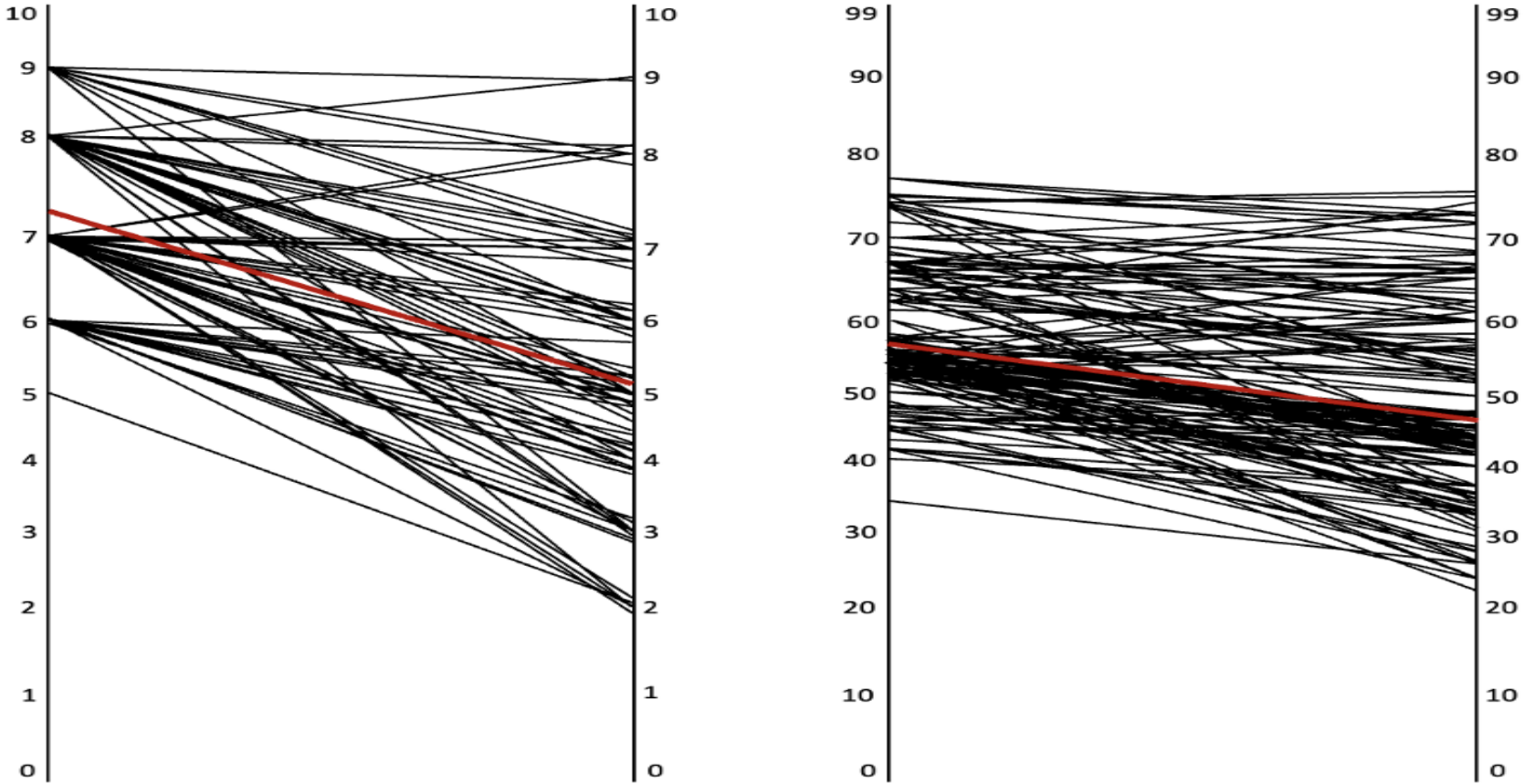
- We hypothesise that pain will **decrease,** and function will **increase** after IA PAAG hydrogel injection in **228** knees of **149** KOA patients.

- The visual analog score (**VAS**) for pain and the Western Ontario and McMaster Universities Arthritis (**WOMAC**) Index score at **52 weeks** after application was evaluated at **twelve months** and presented as **Real-World Data** (**RWD**).

- Average age and standard deviation of the patients was **67.8**±9.1 [Range: 42-87 years].
- Average **Kelgren-Lawrence (**KL) score and standard deviation of the patients was 3.3±0.7 [Range: 2-4] There were 15 (10%), 70 (47%) and 64 (43%) KL2, KL3 and KL4 patients, respectively.

- The **BMI** average and standard deviation was **32.3±**5.4 Kg/m2 [Range: 2-4 Kg/m2].
- VAS decreased, remained unchanged and increased in 131 (88%), 15 (10%) and three (2%) of our KOA patients.
- The largest decrease was from **eight to two** and **nine to three** points in two patients.
- The average VAS decrease was from **7.3**±0.9 to **5.1**±1.7 in twelve months

- **WOMAC** decreased, remained unchanged and increased in 121 (81%), 3 (2%) and 25 (7%) of our patients.
- The largest increase was 12 points in a patient who experienced arthroscopic debridement twice previously. This patient needed additional interventions after IA PAAG injections.
- The average WOMAC decrease was from **58.2**±9.1 to **48.2**±13.0 in 12 months (Figure).
- Having no control group was the limitation of this study. In conclusion, we recommend IA PAAG application in KOA patients when other symptomatic alternatives do not function.



Overall VAS and WOMAC score changes in 228 knees of 149 KOA patients that received IA PAAG.

Osteoarthritis and Cartilage

Intra-Articular Polyacrylamide Hydrogel Injections Improve Pain and Function in Knee Osteoarthritis: A Multicenter Retrospective Study.

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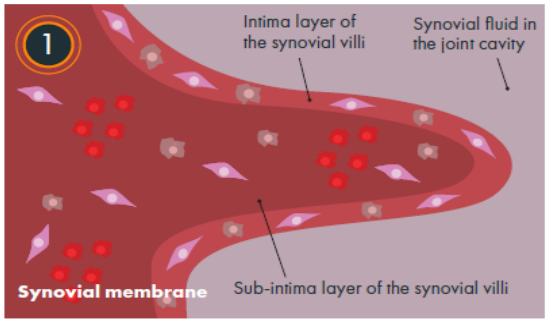
	Selin Demirel
	Feza Korkusuz

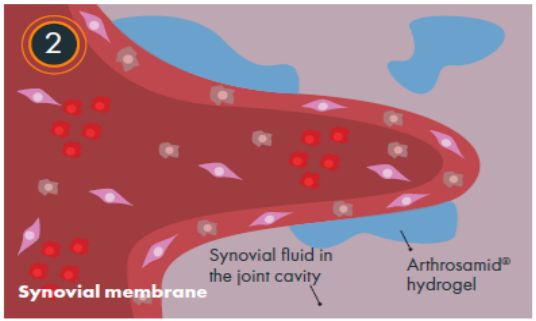
Big DATA : **548** knees from **387** patients 12 month follow-up

Mode of Action — let's take a closer look

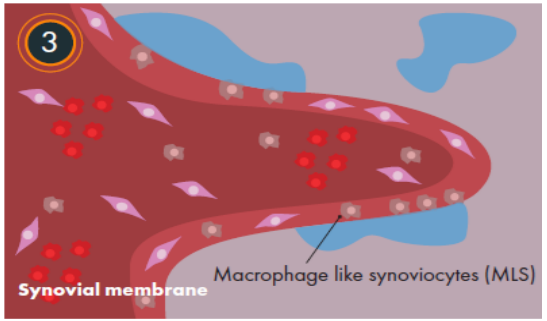
Inflammatory cells | Macrophage-like synoviocytes (MLS) | Arthrosamid® iPAAG hydrogel | Fibroblast-like synoviocytes (FLS)



Untreated OA knee: the synovial fluid loses its viscoelastic properties. The synovial membrane contains an accumulation of inflammatory cells that are a precursor to pain and swelling.[18]

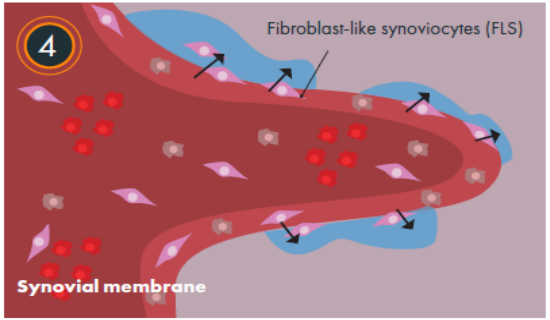


Arthrosamid is injected into the joint cavity, distributes within the joint fluid, and begins to adhere to the synovial lining.[19]



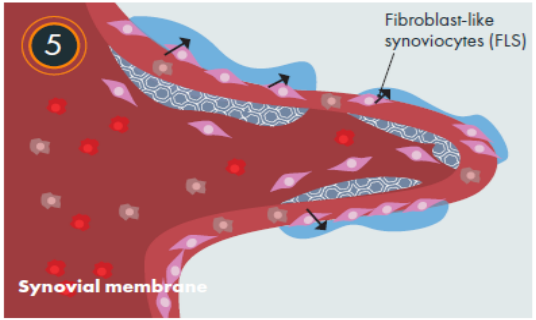
Macrophage like synoviocytes (MLS) enter the hydrogel but are unable to phagocytise

Synovial implant

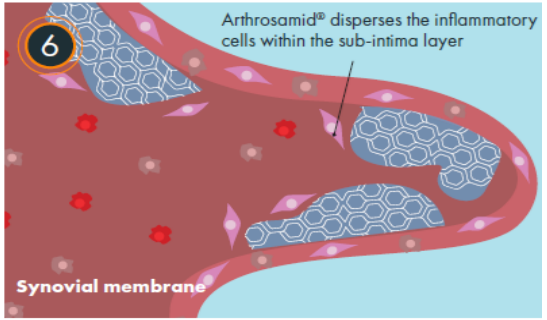


The MLS cells differentiate into fibroblast-like synoviocytes (FLS) which start integrating through the hydrogel, creating a thin vessel bearing fibrous network.[19]

iPAAG: Injectable polyacrylamide hydrogel

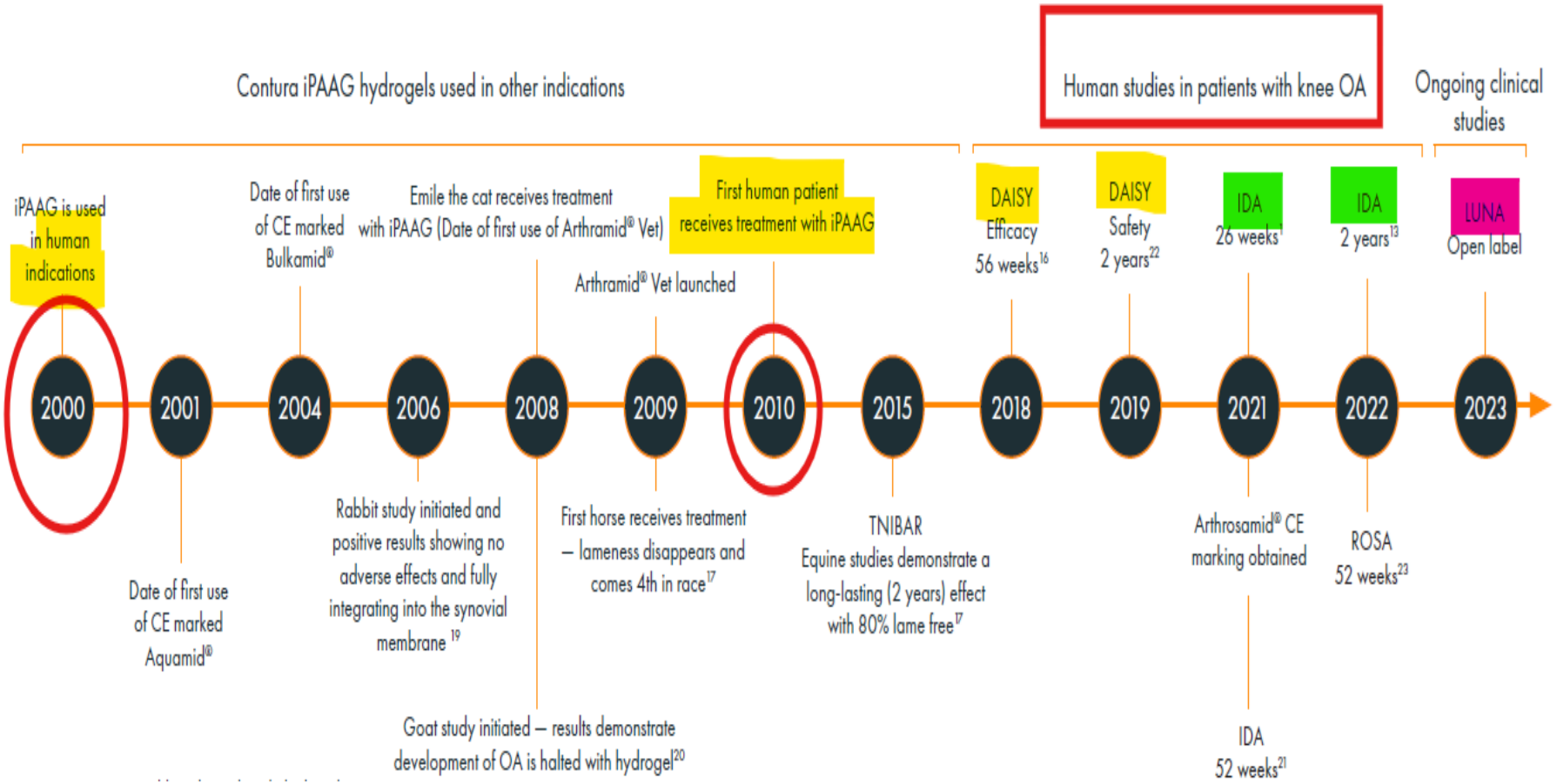


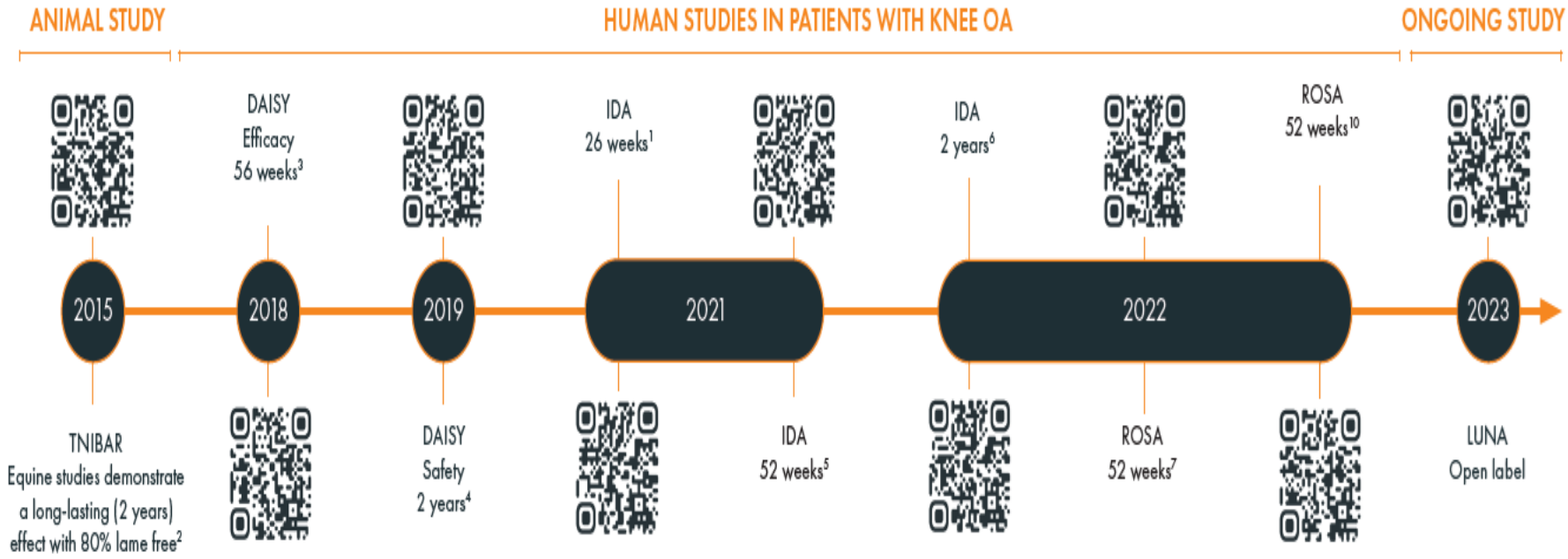
A new layer of intima forms on the top of the integrated iPAAG synovial membrane.[19] This new layer consists of scattered non inflammatory type cells, with the iPAAG acting as a scaffold within the sub-intima layer. This process takes 1 month.[20]



The thickening of the synovial sub-intima layer[20] causes distancing of the inflammatory cells[7] and breaks the inflammatory cycle.

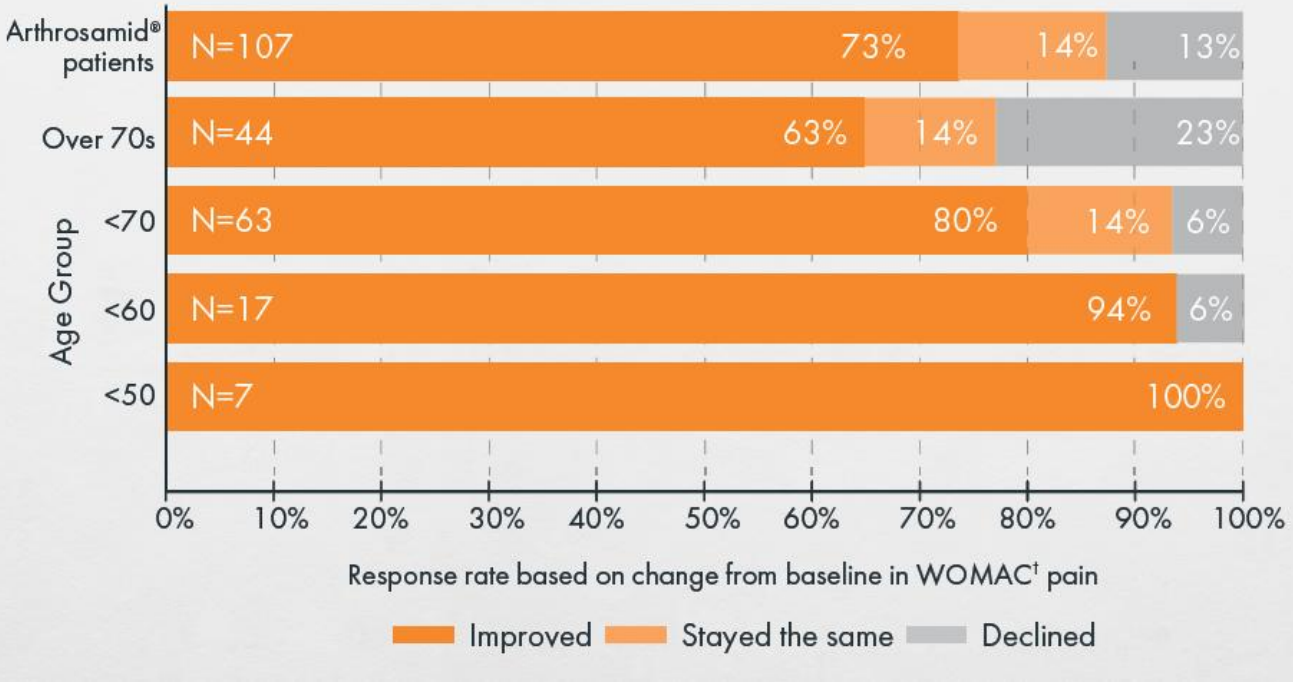
Time Table


Contura iPAAG hydrogels used in other indications
Human studies in patients with knee OA
Ongoing clinical studies
iPAAG is used in human indications
2000
Date of first use of CE marked Aquamid®
2001
Date of first use of CE marked Bulkamid®
2004
Rabbit study initiated and positive results showing no adverse effects and fully integrating into the synovial membrane [19]
2006
Emile the cat receives treatment with iPAAG (Date of first use of Arthramid® Vet)
Goat study initiated – results demonstrate development of OA is halted with hydrogel[20]
2008
Arthramid® Vet launched
First horse receives treatment – lameness disappears and comes 4th in race[17]
2009
First human patient receives treatment with iPAAG
2010
TNIBAR
Equine studies demonstrate a long-lasting (2 years) effect with 80% lame free[17]
2015
DAISY
Efficacy
56 weeks[16]
2018
DAISY
Safety
2 years[22]
2019
IDA
26 weeks[1]
Arthrosamid® CE marking obtained
IDA
52 weeks[21]
2021
IDA
2 years[13]
ROSA
52 weeks[23]
2022
LUNA
Open label
2023


ANIMAL STUDY
HUMAN STUDIES IN PATIENTS WITH KNEE OA
ONGOING STUDY
2015
2018
2019
2021
2022
2023
TNIBAR
Equine studies demonstrate a long-lasting (2 years) effect with 80% lame free[2]
DAISY
Efficacy
56 weeks[3]
DAISY
Safety
2 years[4]
IDA
26 weeks[1]
IDA
52 weeks[5]
IDA
2 years[6]
ROSA
52 weeks[7]
ROSA
52 weeks[10]
LUNA
Open label

Response rate with Arthrosamid®

A randomised study of one-year performance of polyacrylamide hydrogel (iPAAG) vs. hyaluronic acid.[23]



80% response rate with the under 70 year olds.[7]

My clinical experiences

Start injection date **1.02.2023** between **24.04.2025**

- **572** patient
- **484** Female
- 88 Male

Processed data (Still processing)

- 132 Left , 97 Right, 318 Bilateral
- x ray KL Grade (439 Patient)
  - Gr 2 : 30 ,
  - Gr 3 : 393 ,
  - Gr 4 : 16
- VAS , WOMAC (injection - 1 year follow up)

Additional Treatment (s)

Weight Loss
Physical Therapy >> Exercise
Medications (NSAiD)

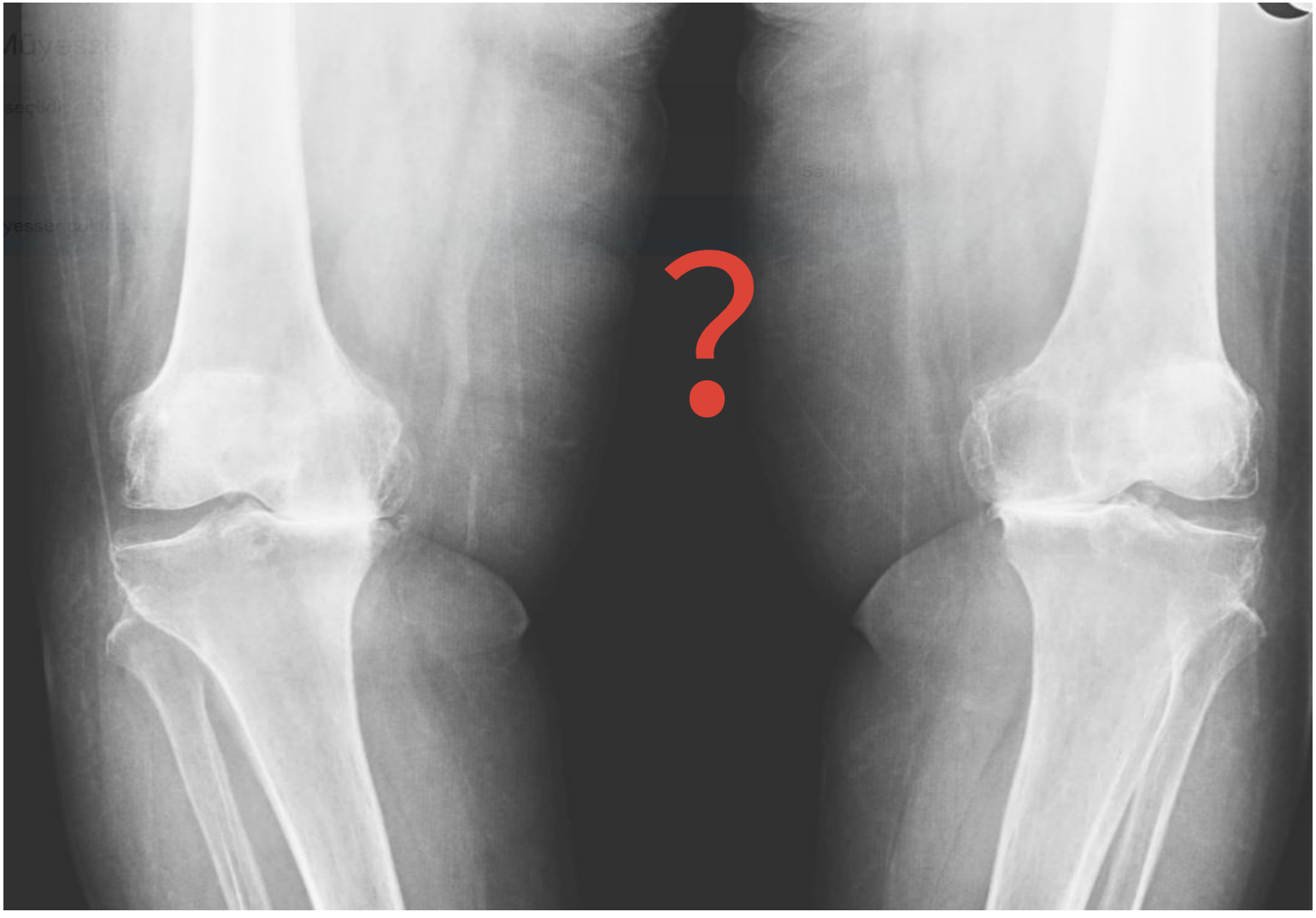
Custom made insole

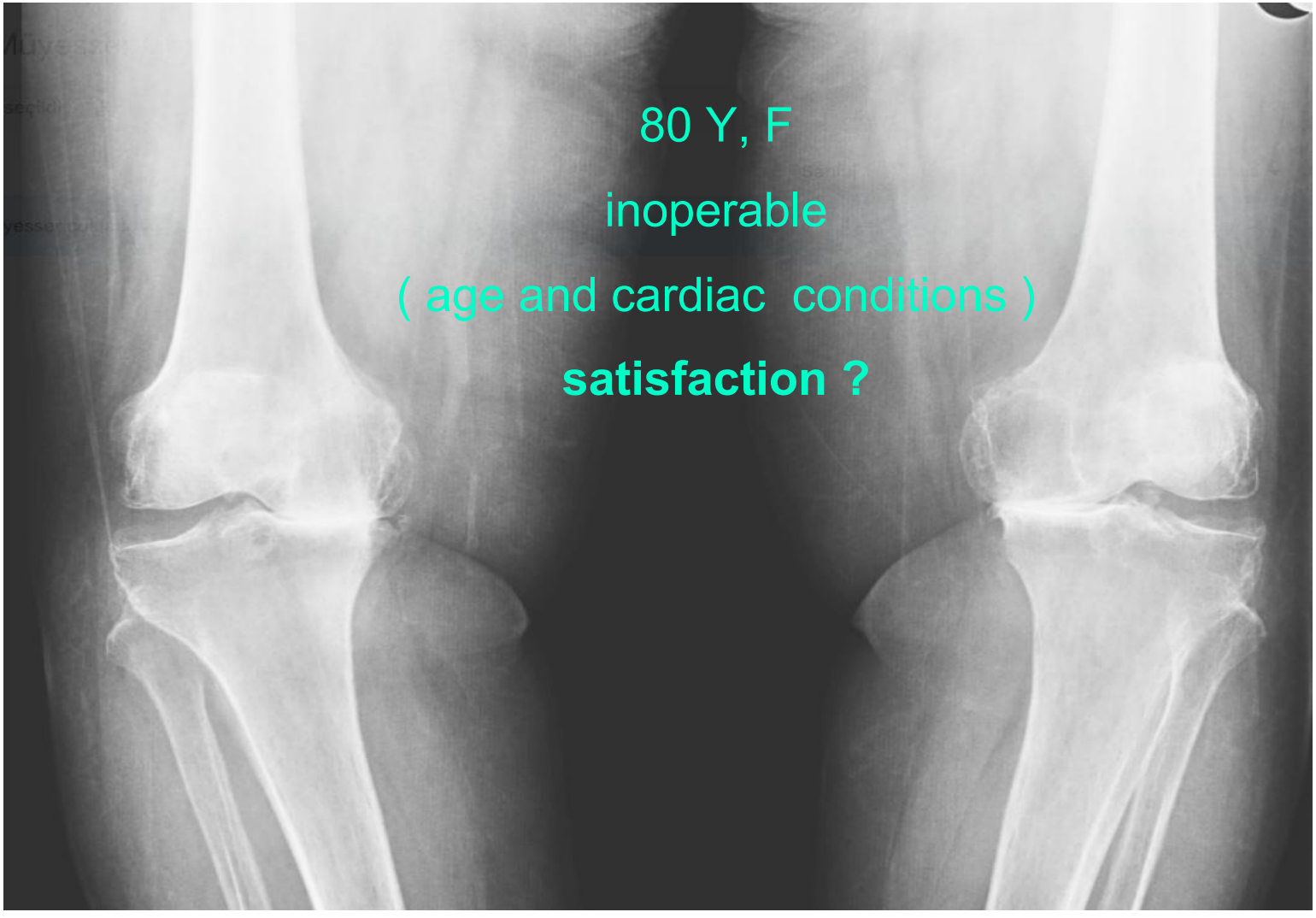
Prolotherapy
Tendon release ? (**mcl** ?)

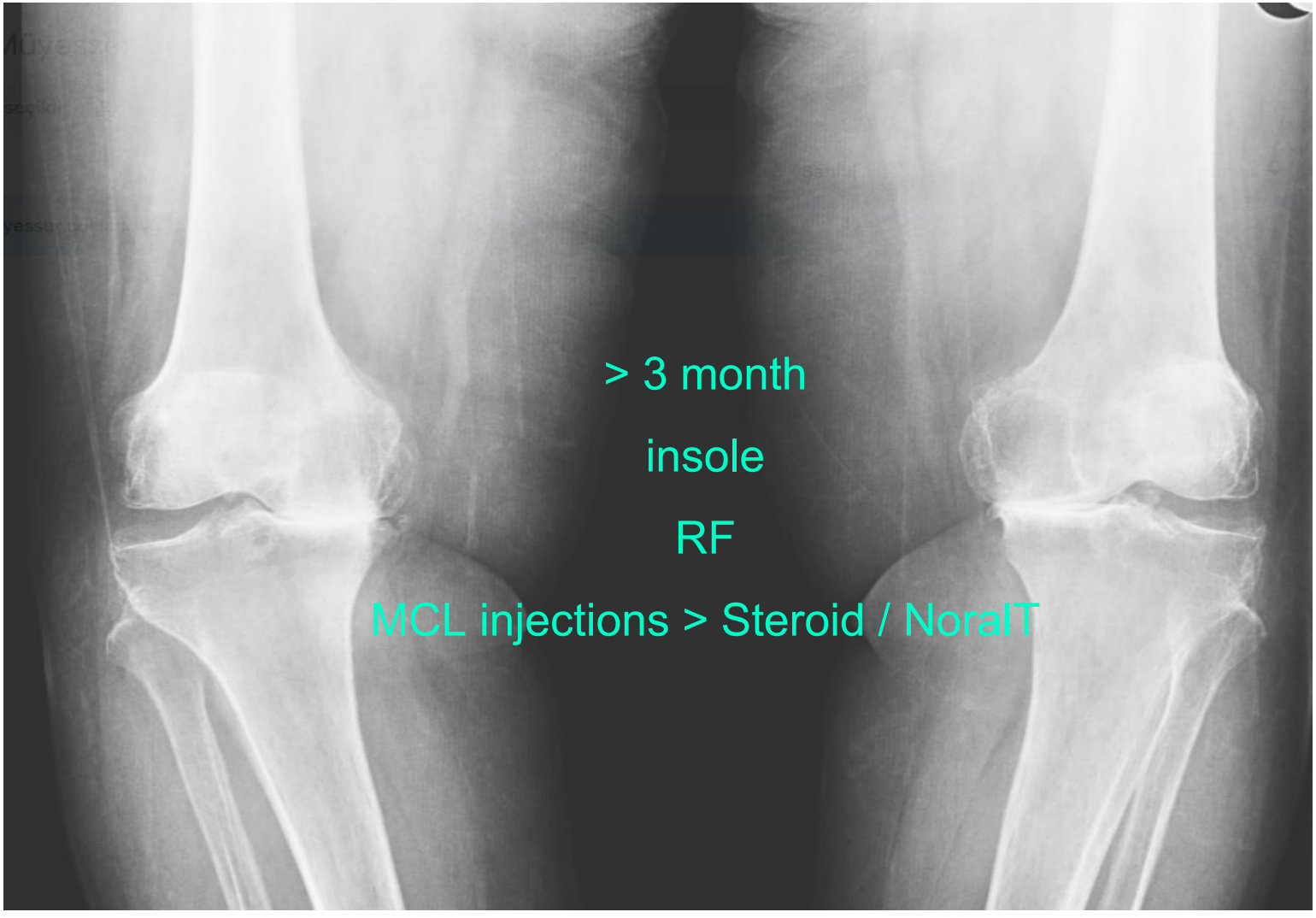
R U READY ?

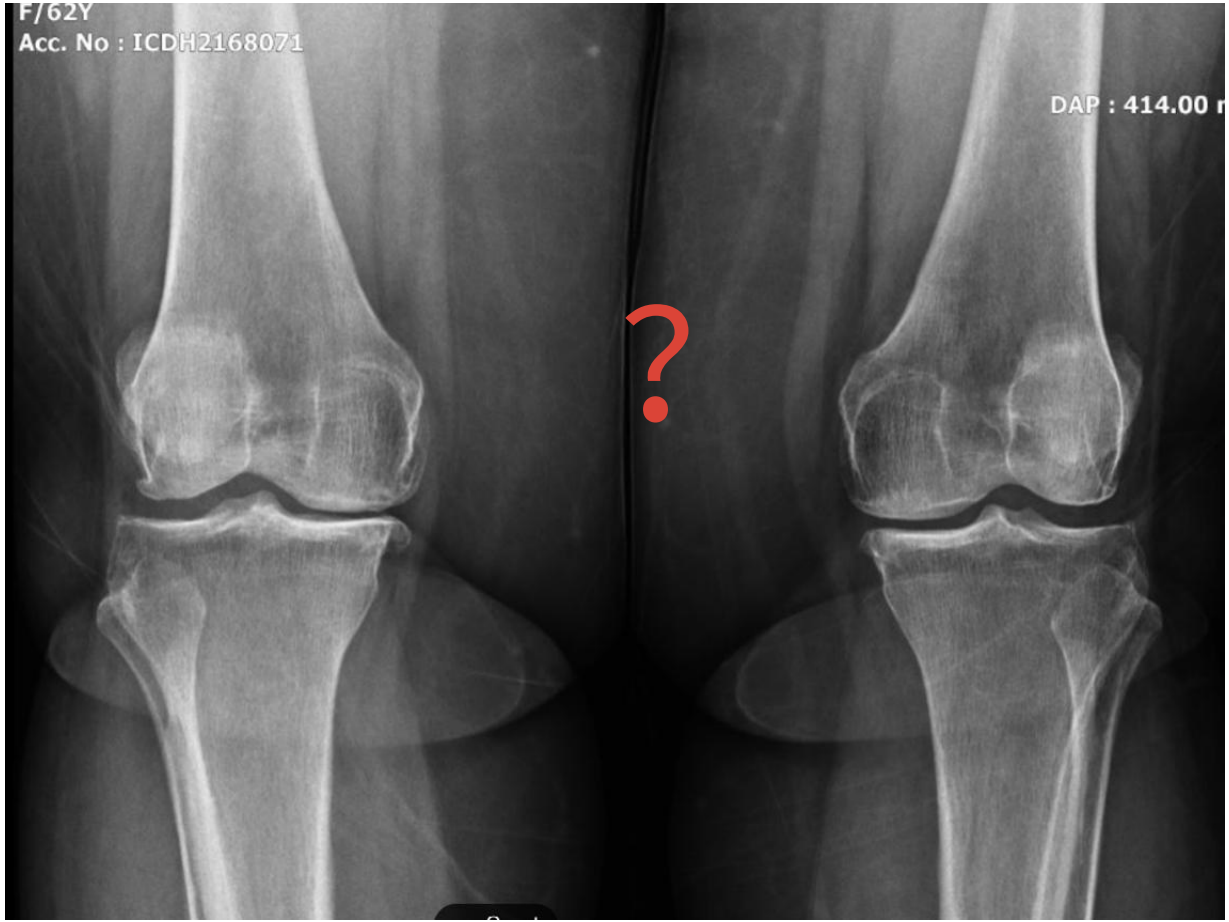
TO BE

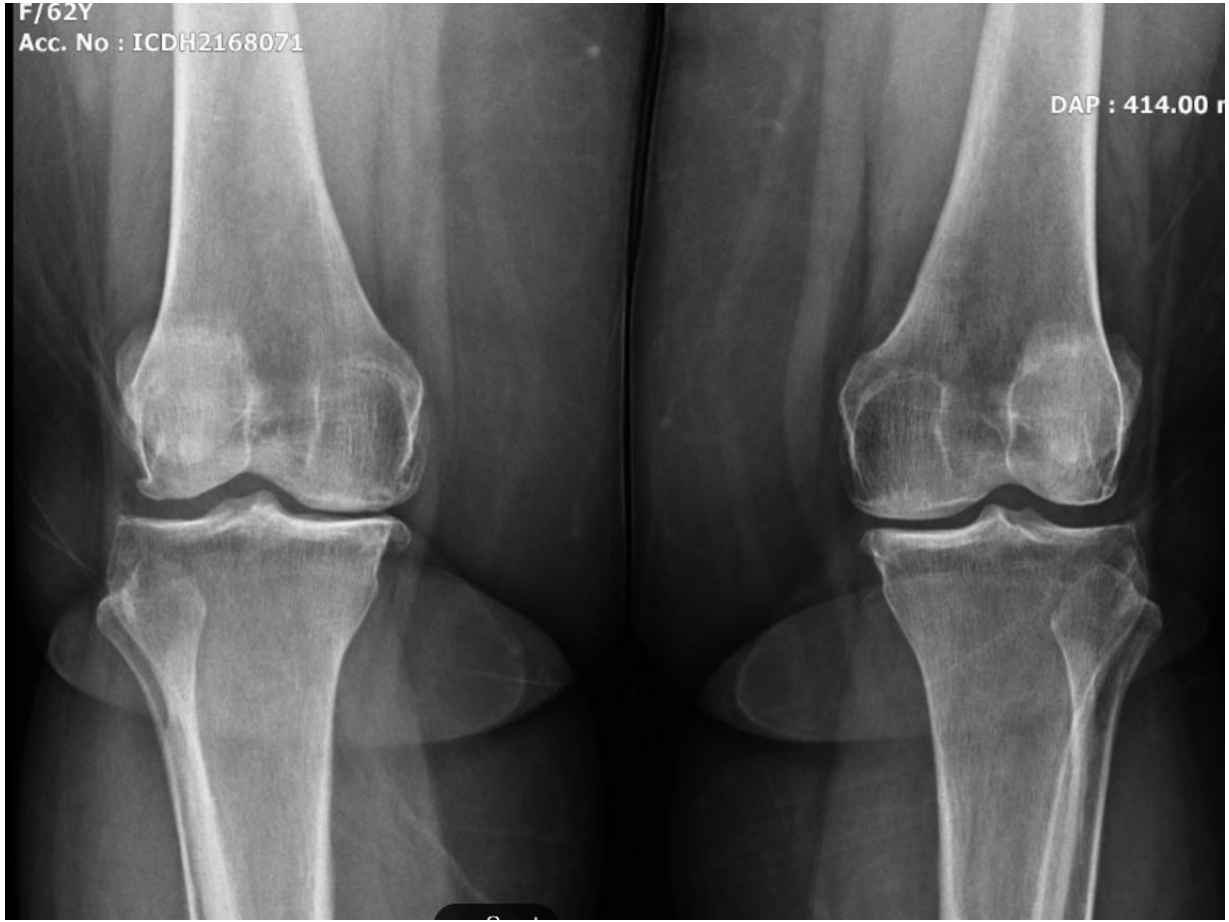
SURPRISED !!!

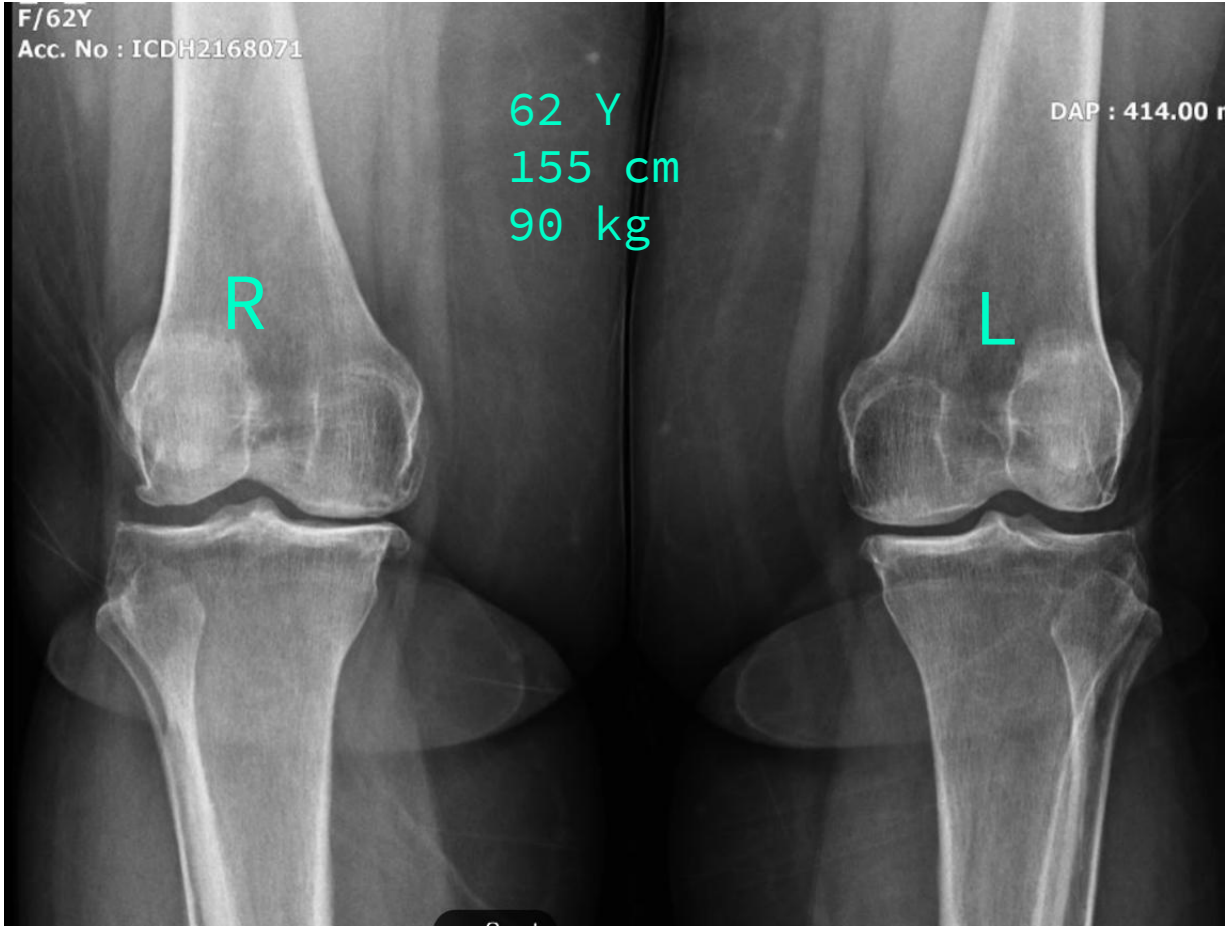


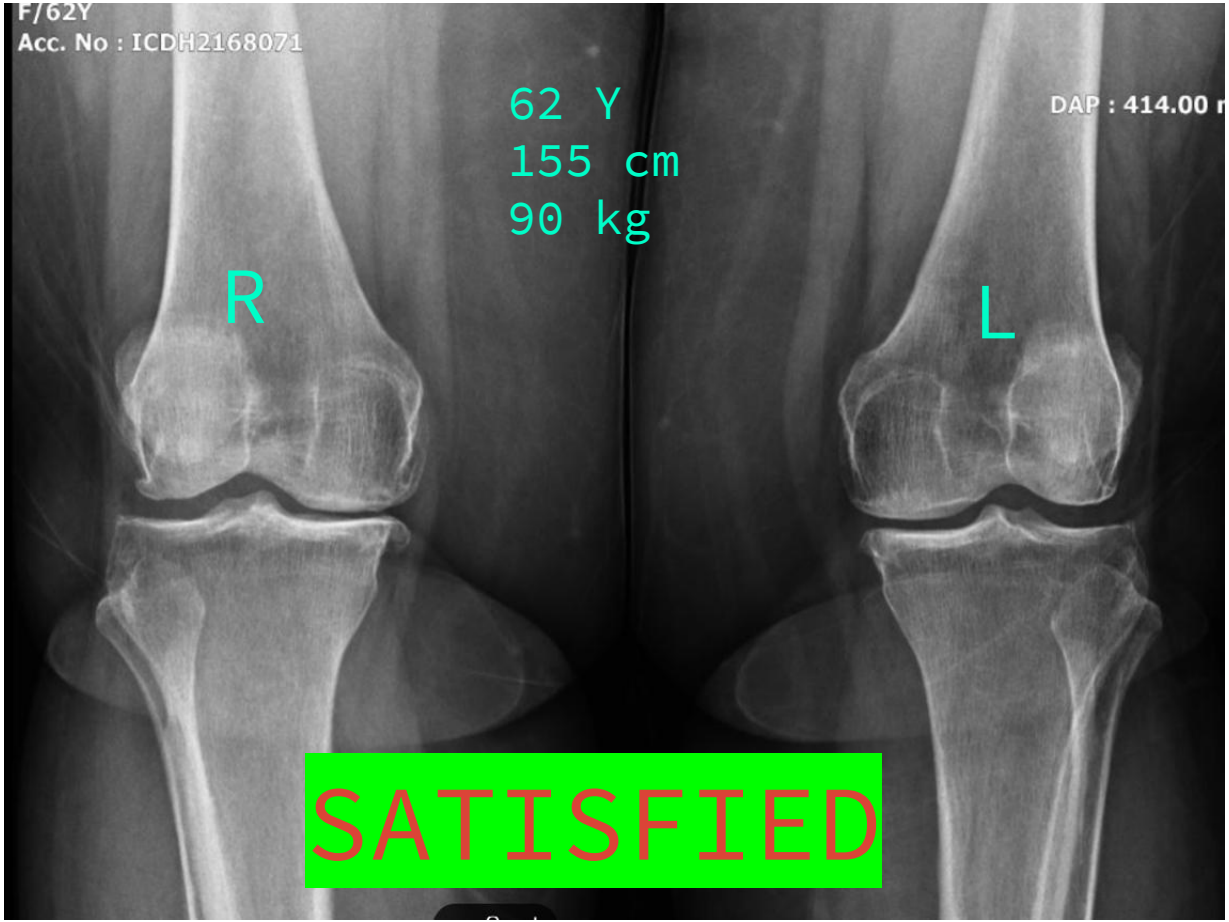

80 Y, F
inoperable
(age and cardiac conditions)
satisfaction ?

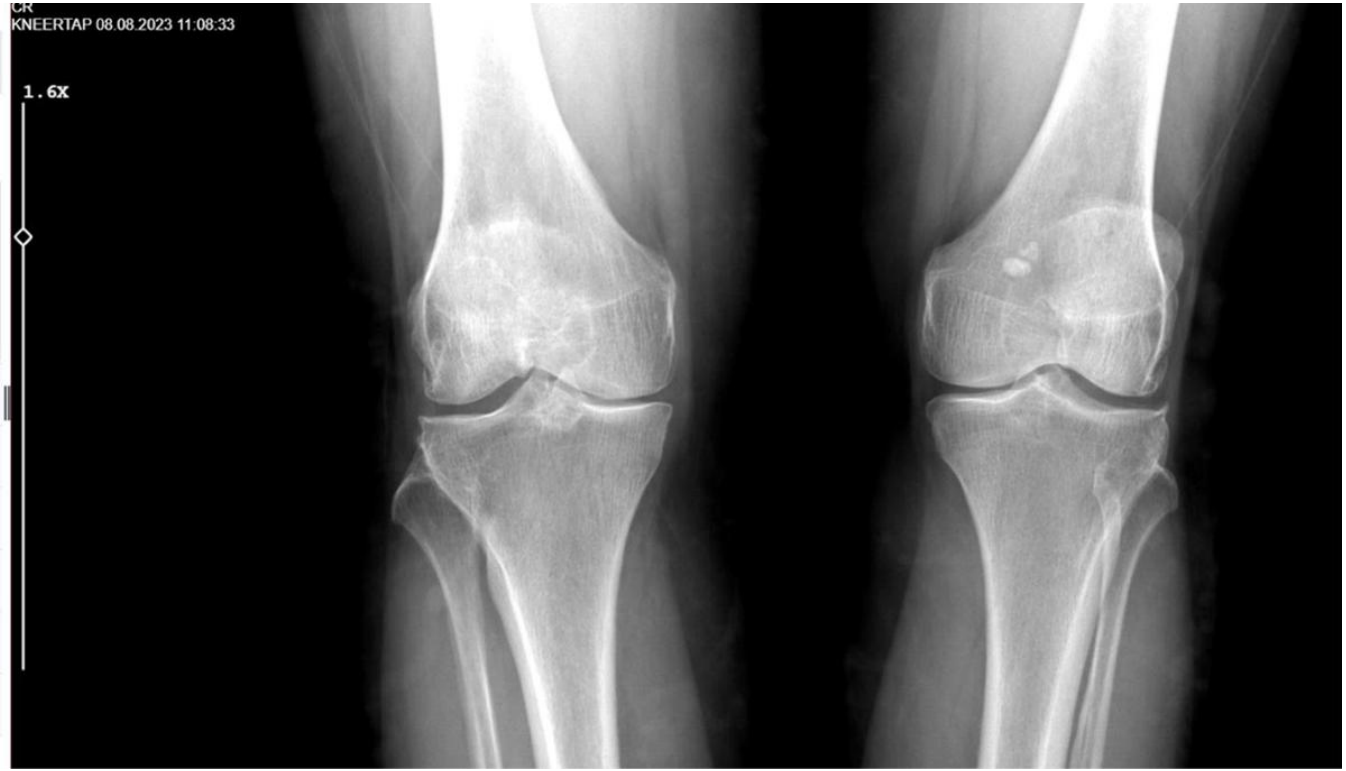

> 3 month
insole
RF
MCL injections > Steroid / NoralT

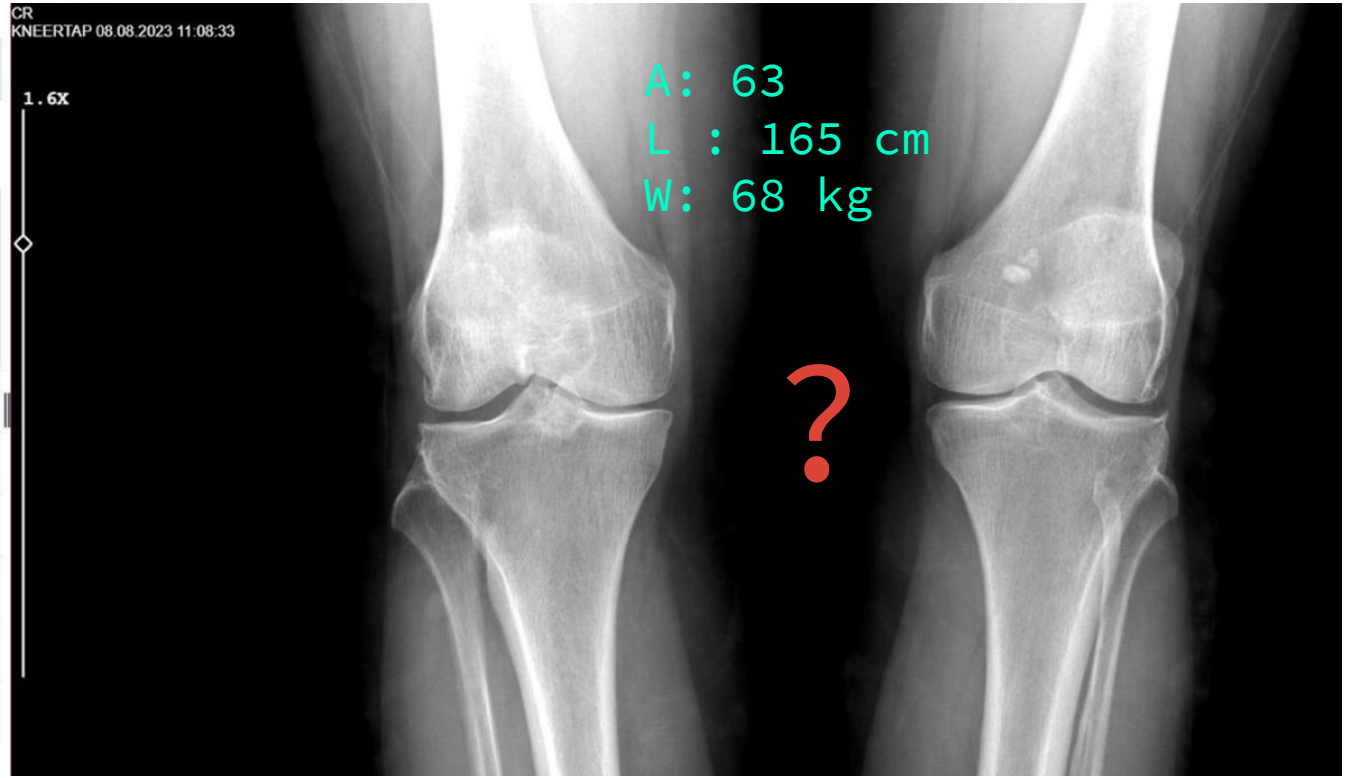

F/62Y
Acc. No : ICDH2168071
DAP : 414.00 r
?

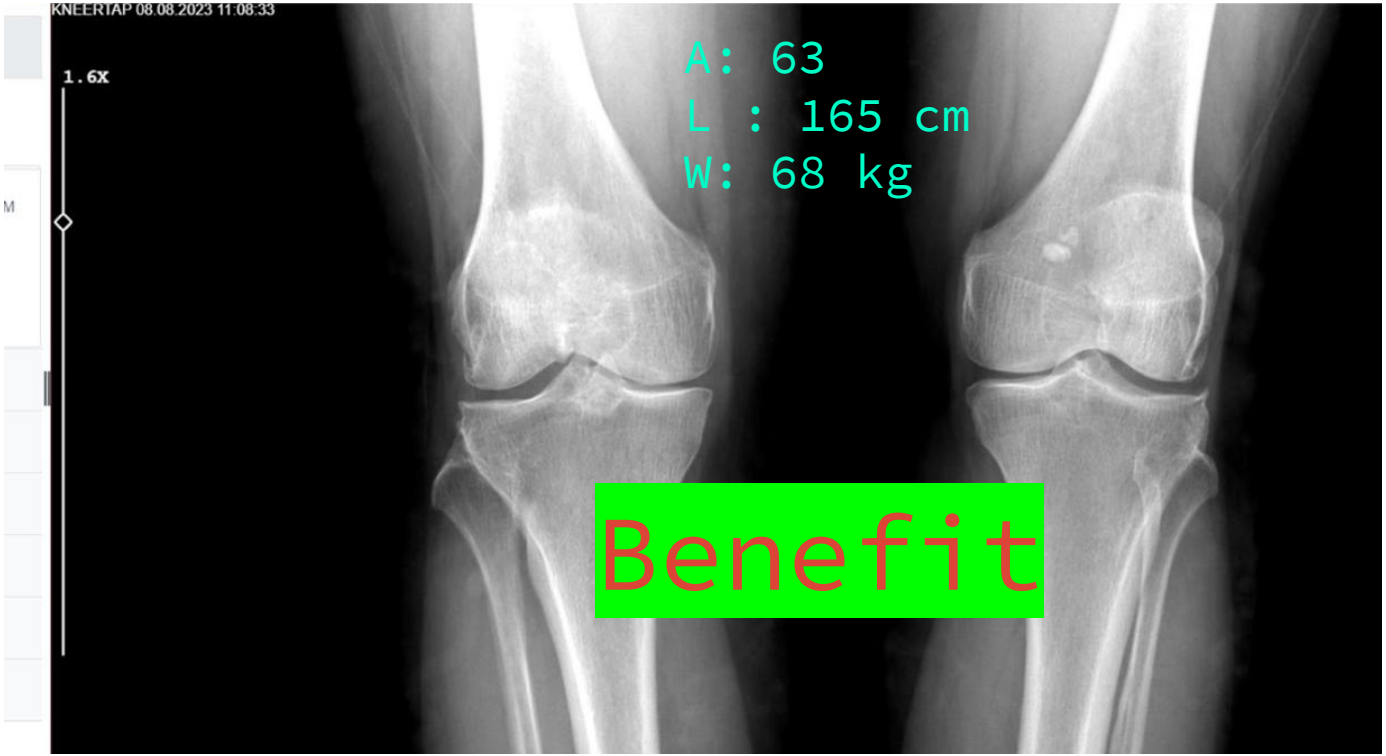

F/62Y
Acc. No : ICDH2168071
DAP : 414.00 r

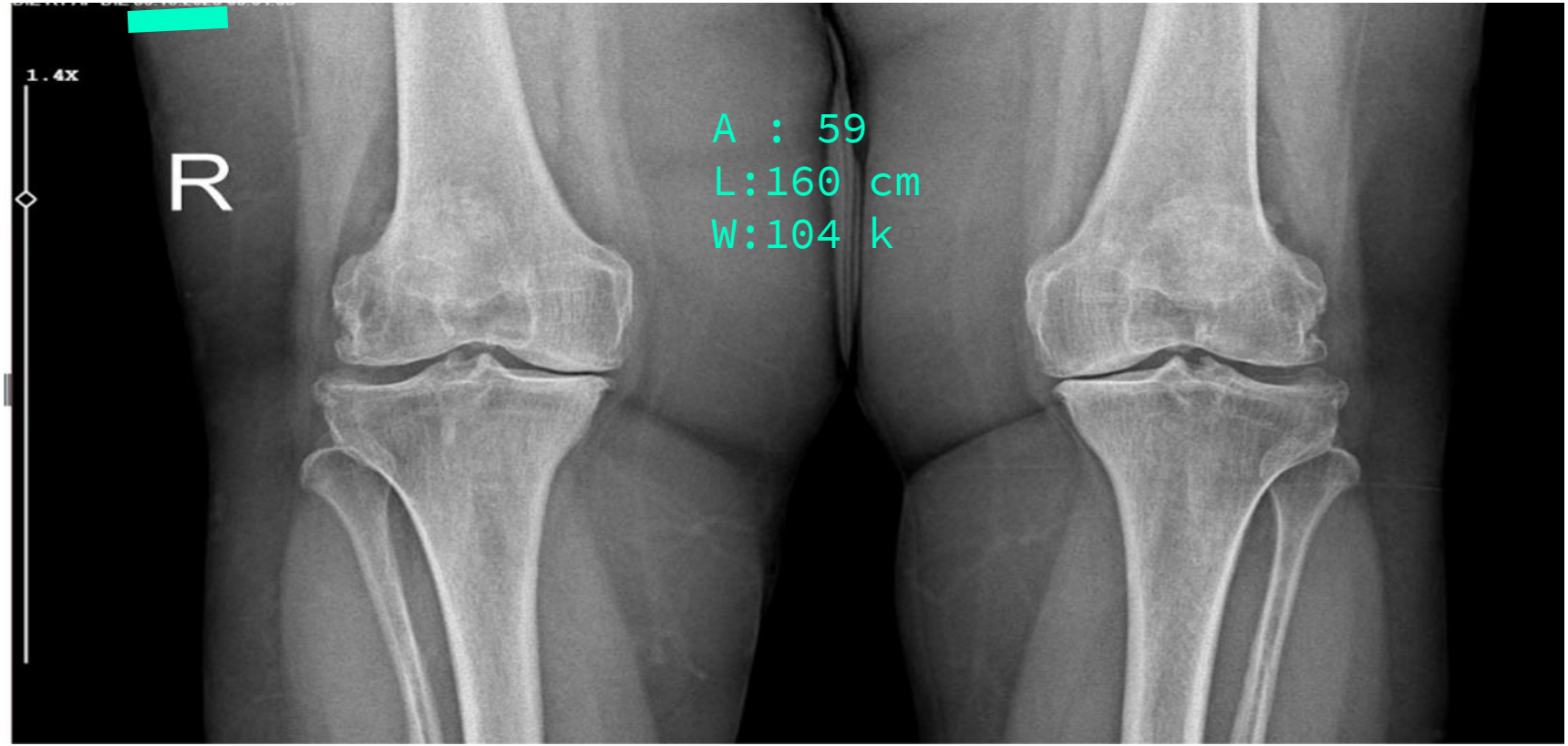

F/62Y
Acc. No : ICDH2168071
62 Y
155 cm
90 kg
DAP : 414.00
R
L

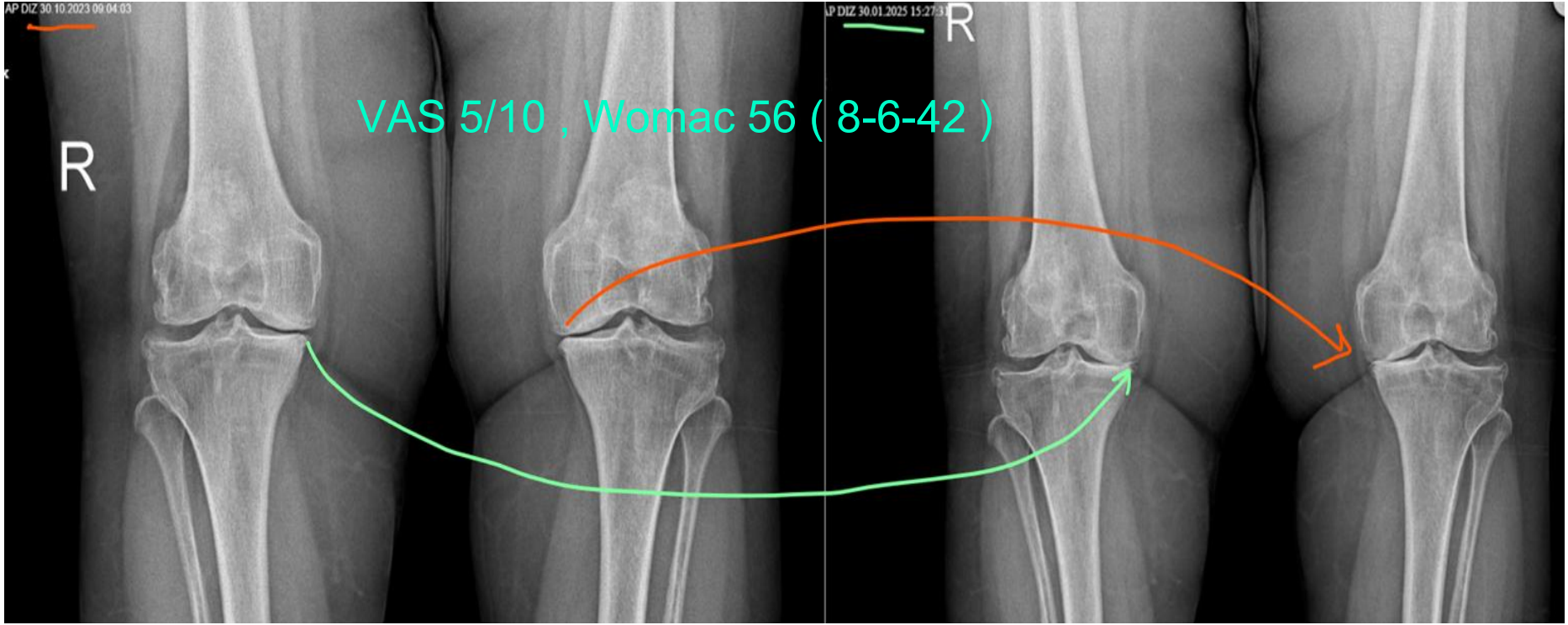

F/62Y
Acc. No : ICDH2168071
62 Y
155 cm
90 kg
DAP : 414.00 r
R
L
SATISFIED

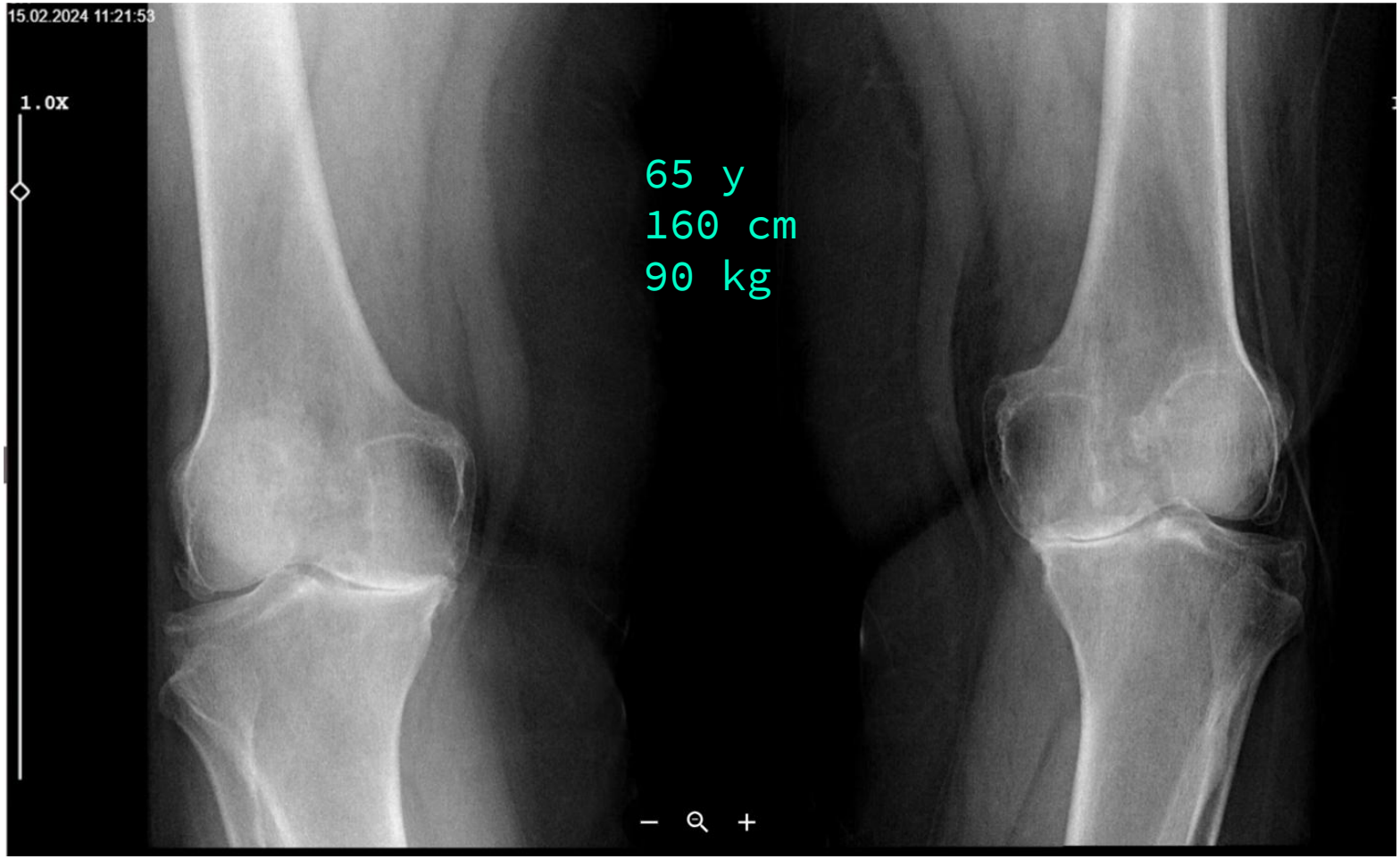

CR
KNEERTAP 08.08.2023 11:08:33
1.6X

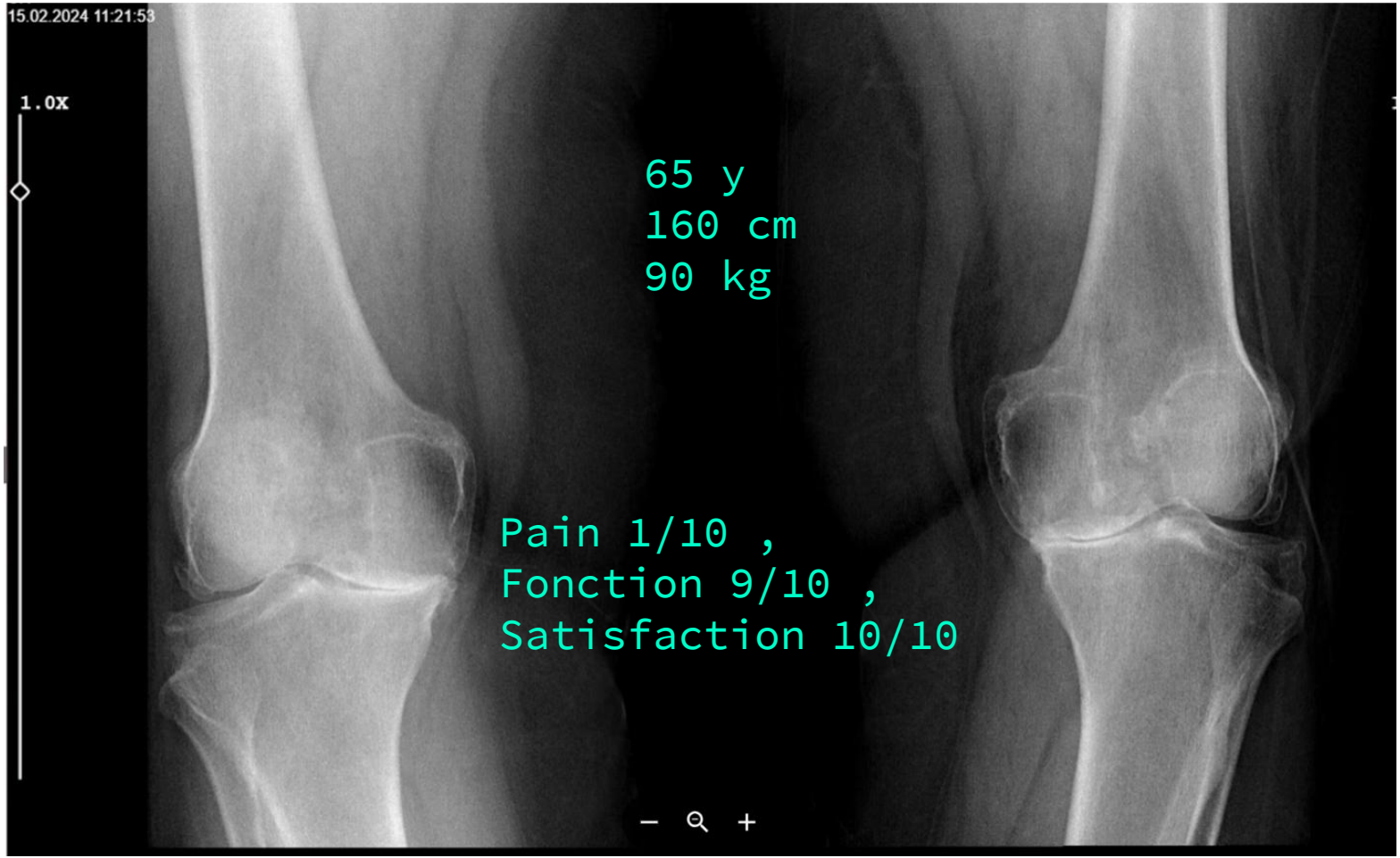

CR
KNEERTAP 08.08.2023 11:08:33
1.6X
A: 63
L : 165 cm
W: 68 kg
?

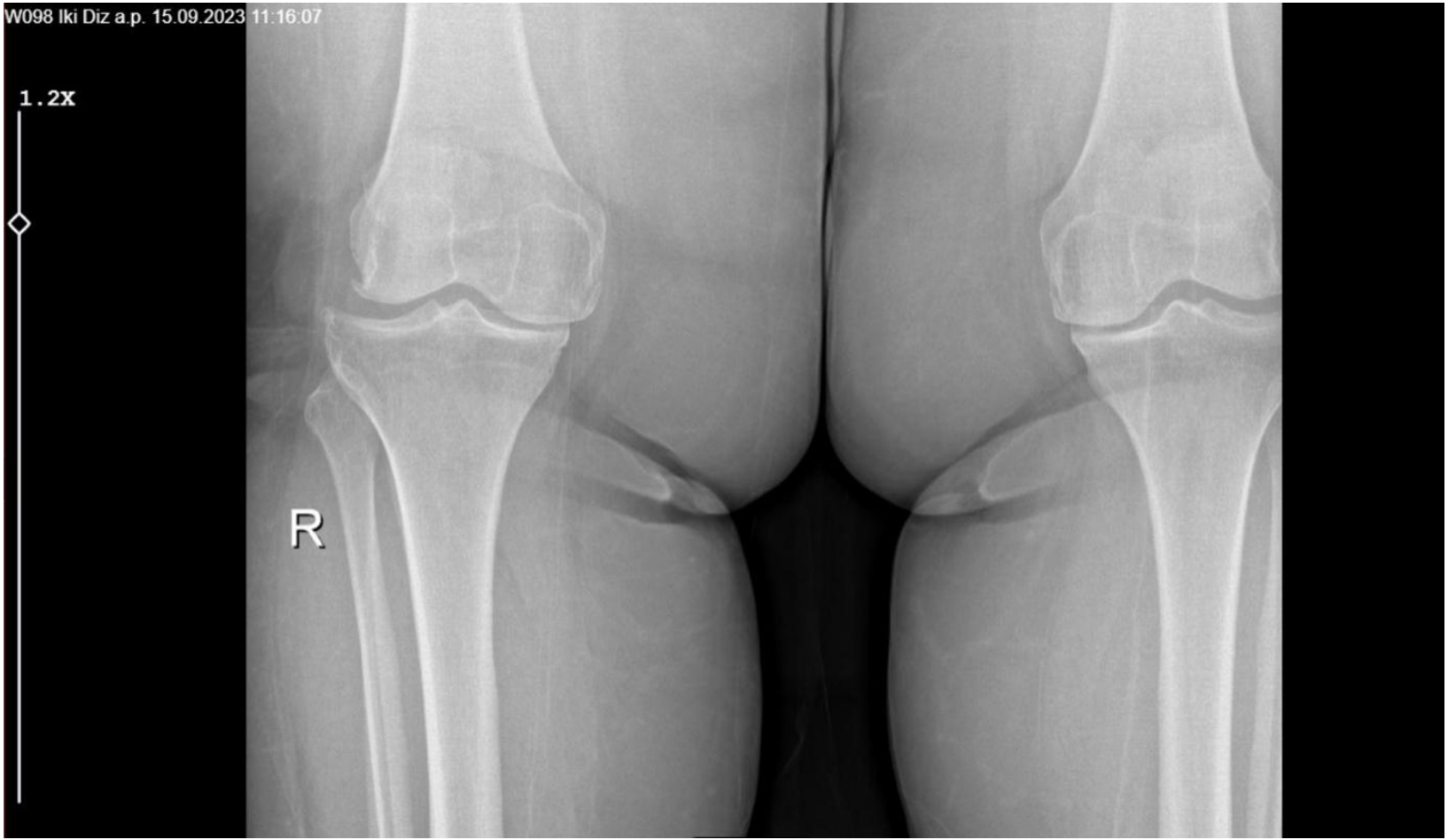

KNEERTAP 08.08.2023 11:08:33
1.6X
A: 63
L : 165 cm
W: 68 kg
Benefit

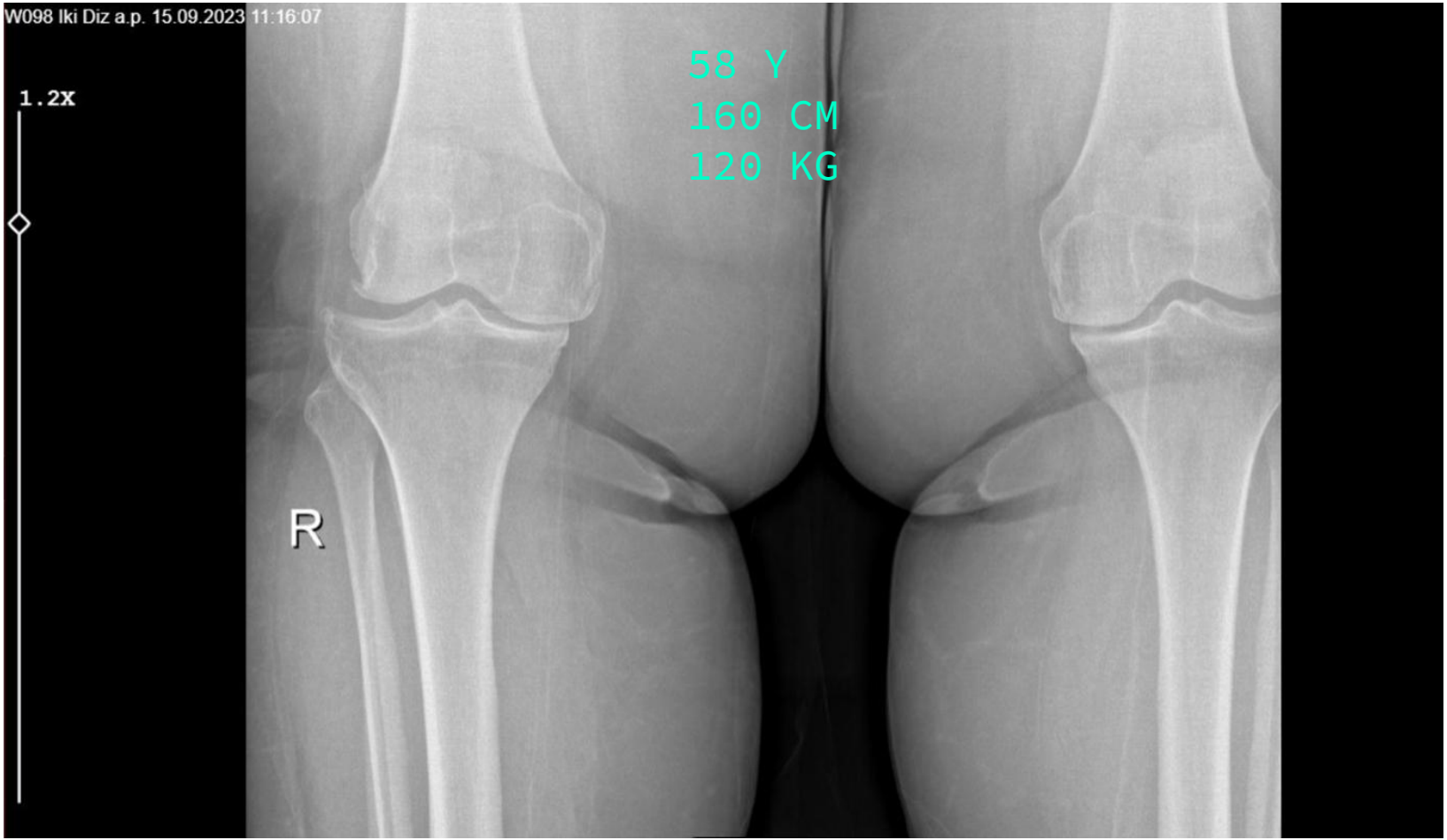

1.4X
R
A : 59
L:160 cm
W:104 k


AP DIZ 30.10.2023 09:04:03
R
VAS 5/10 , Womac 56 (8-6-42)
AP DIZ 30.01.2025 15:27:31
R


15.02.2024 11:21:53
1.0x
65 y
160 cm
90 kg


15.02.2024 11:21:53
1.0x
65 y
160 cm
90 kg
Pain 1/10 ,
Fonction 9/10 ,
Satisfaction 10/10


W098 Iki Diz a.p. 15.09.2023 11:16:07
1.2X
R


W098 Iki Diz a.p. 15.09.2023 11:16:07
1.2X
58 Y
160 CM
120 KG
R

Over ALL ...

Patient selection is important !!!!

Need Time & more study

?

THANK YOU FOR YOUR PATIENT :)