



6<sup>th</sup> International Anthropological Congress of Dr. Ales Hrdlicka 150<sup>TH</sup> anniversary of birth  
"All mankind is of one origin"

## PROSPECTS OF APPLICATION OF 3D SCANNER IN TERMS OF CHILDREN'S ORTHOPEDIC CENTER

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**St. Petersburg, Russia**

HUMPOLEC  
2019





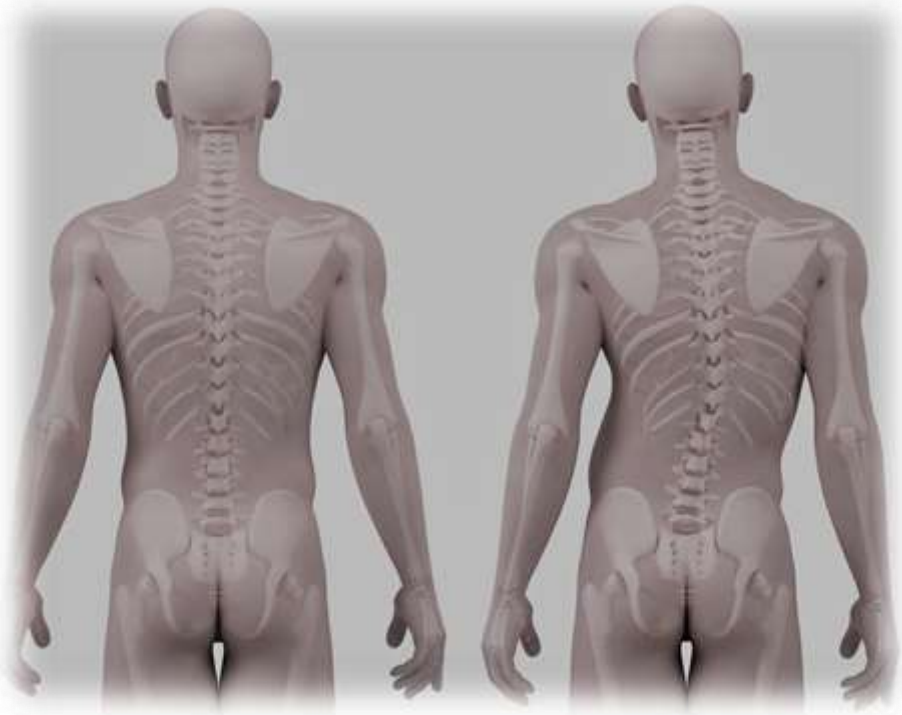
## ONE OF THE BASIC DIAGNOSTIC OBJECTIVES DURING CURATION OF PATIENTS WITH POSTURE DEFECTS - OBJECTIVE ASSESSMENT OF SYMPTOMS



The solution to the problem becomes possible provided that instrumental diagnostics are used, which makes it possible to measure the quantitative characteristics of various manifestations of spinal deformity



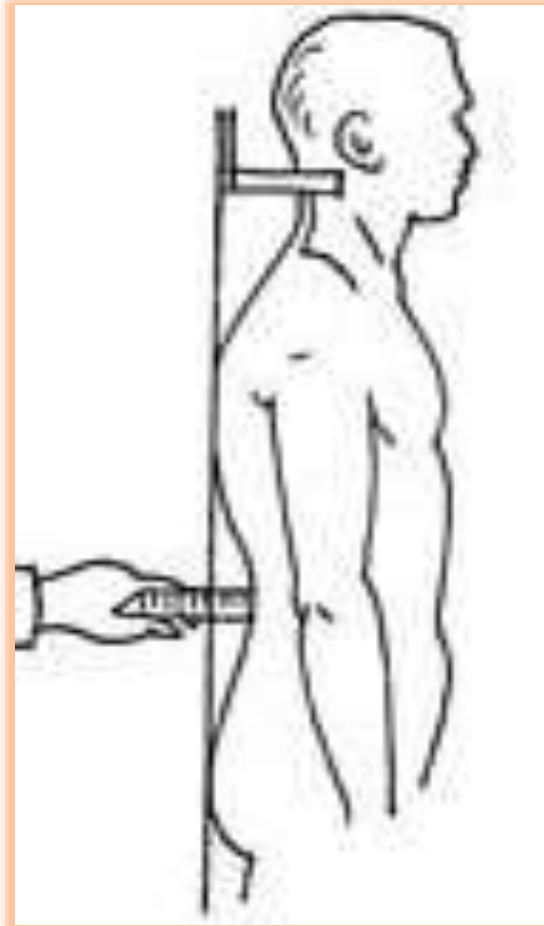
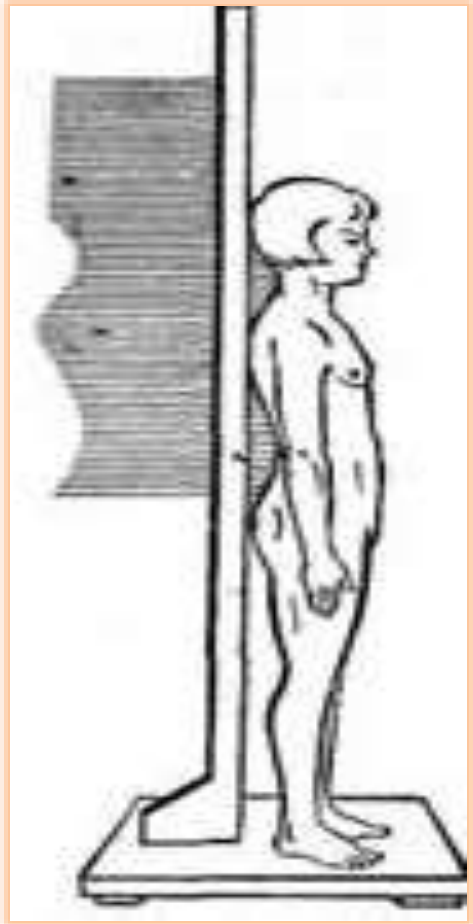
# EVOLUTION OF METHODS OF NON-RADIATION DIAGNOSTICS OF SPINE DEFORMATION



Frontal plane



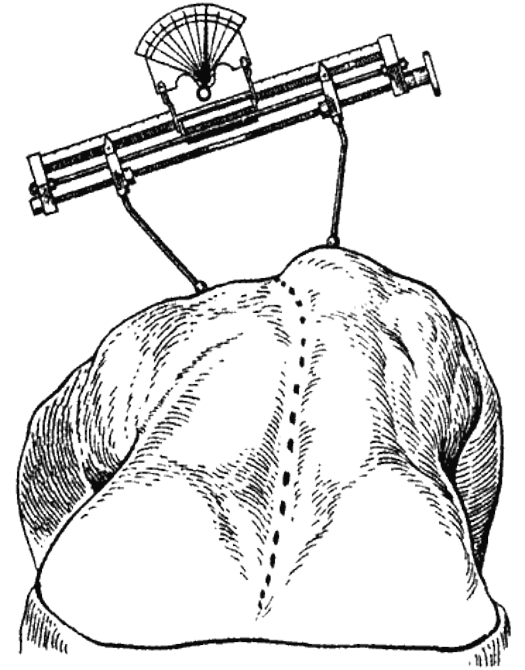
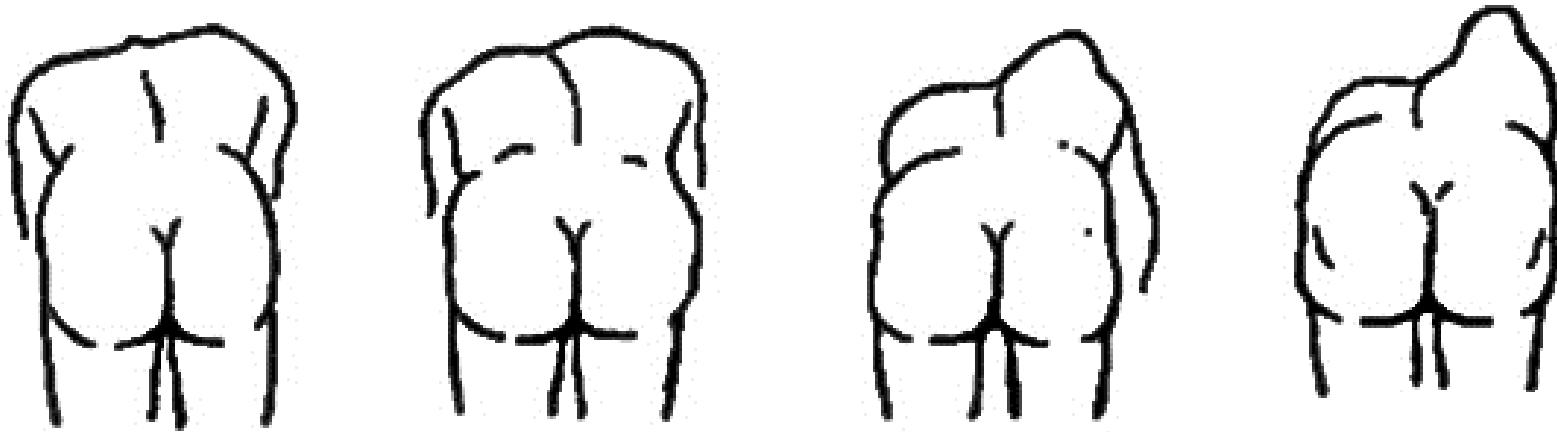
# EVOLUTION OF METHODS OF NON-RADIATION DIAGNOSTICS OF SPINE DEFORMATION



Sagittal plane



# EVOLUTION OF AIS NON-RADIATION DIAGNOSTICS METHODS

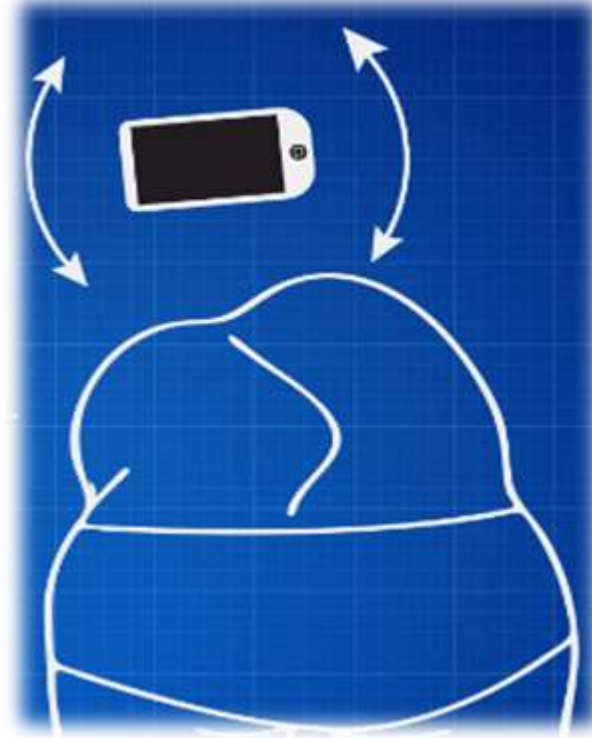
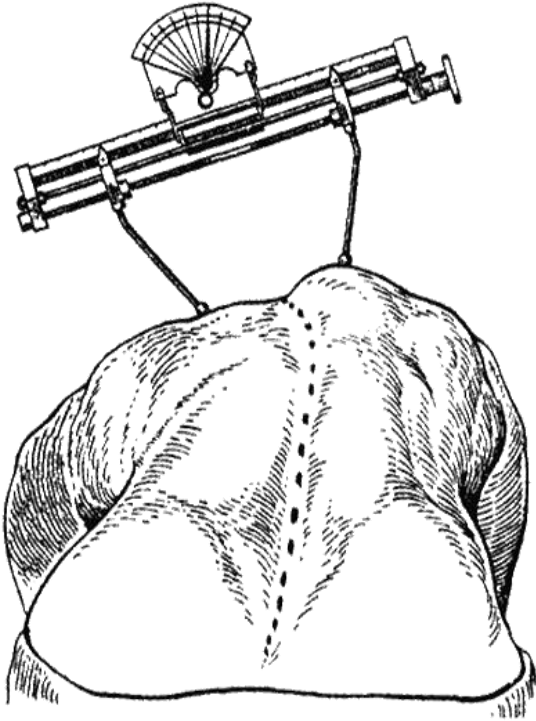


Horizontal plane





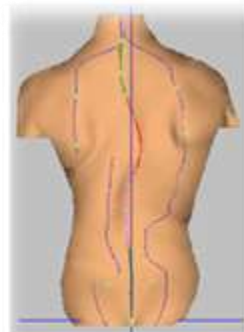
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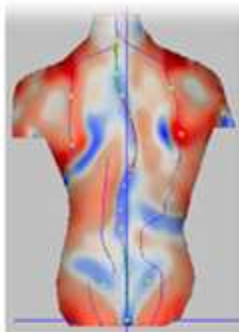
Horizontal plane



# COMPUTER OPTICAL TOPOGRAPHY



3D-модель без текстурной раскраски



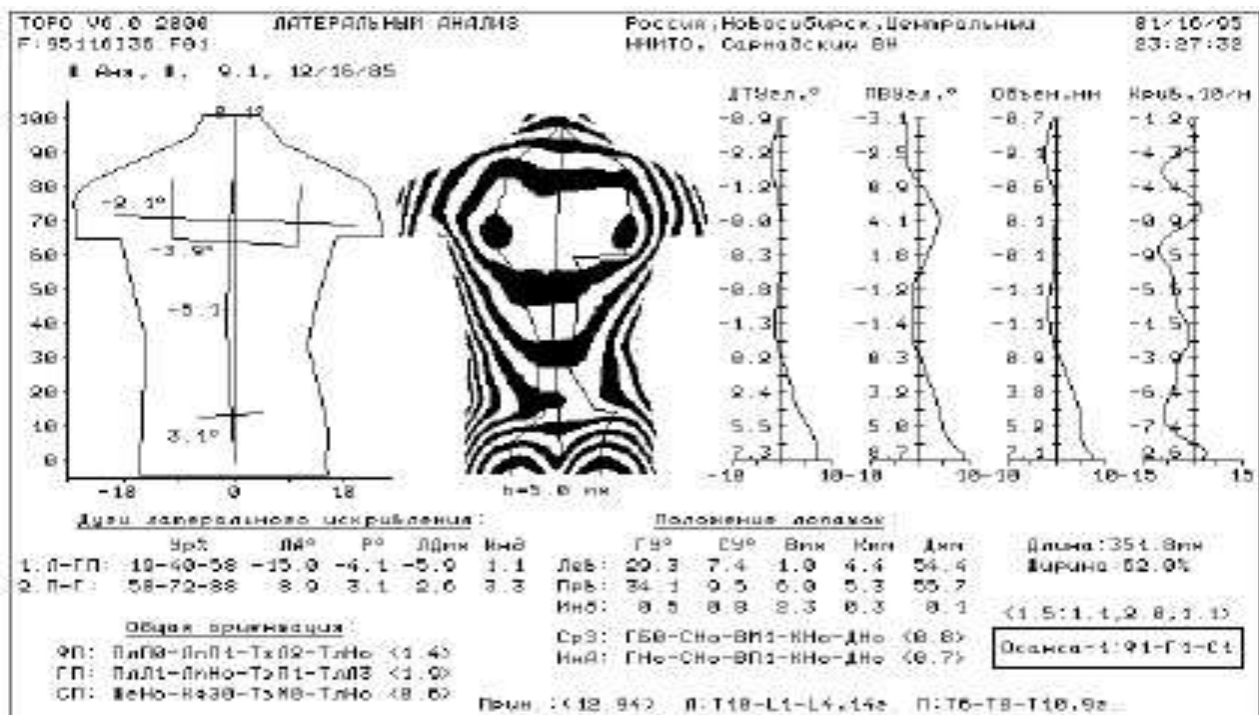
Раскраска в соответствии с кривизной поверхности



Раскраска в виде полутоновой топограммы

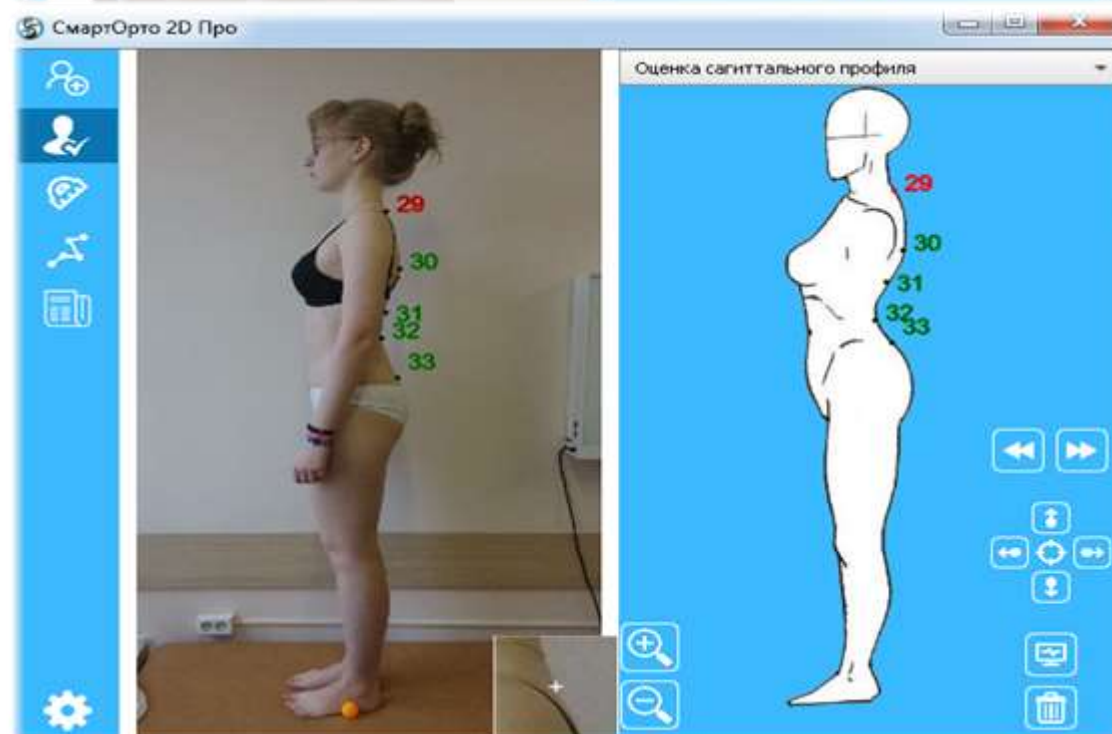
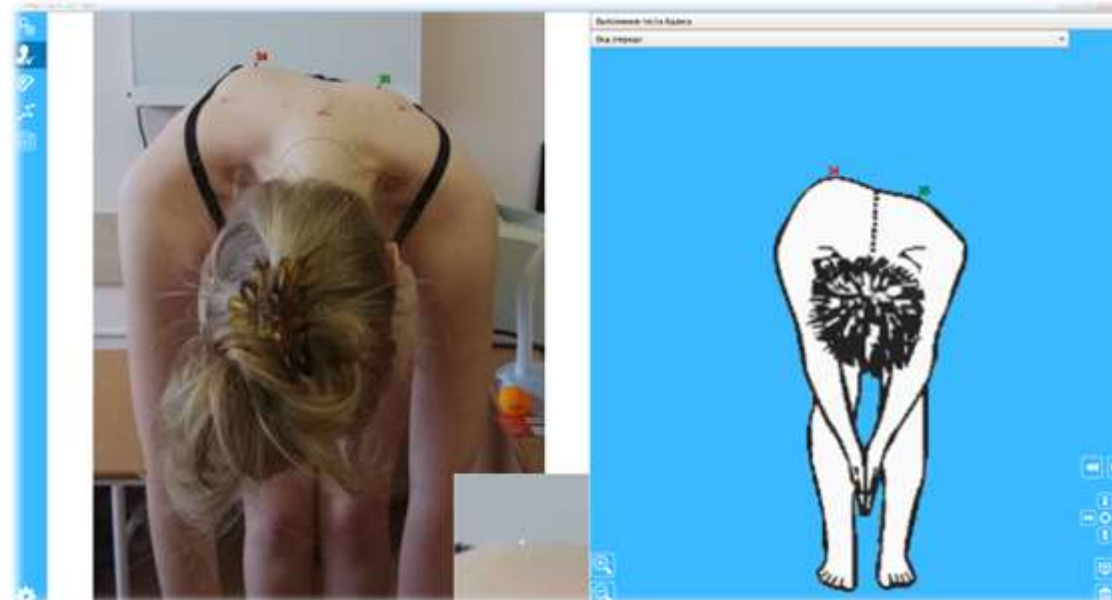
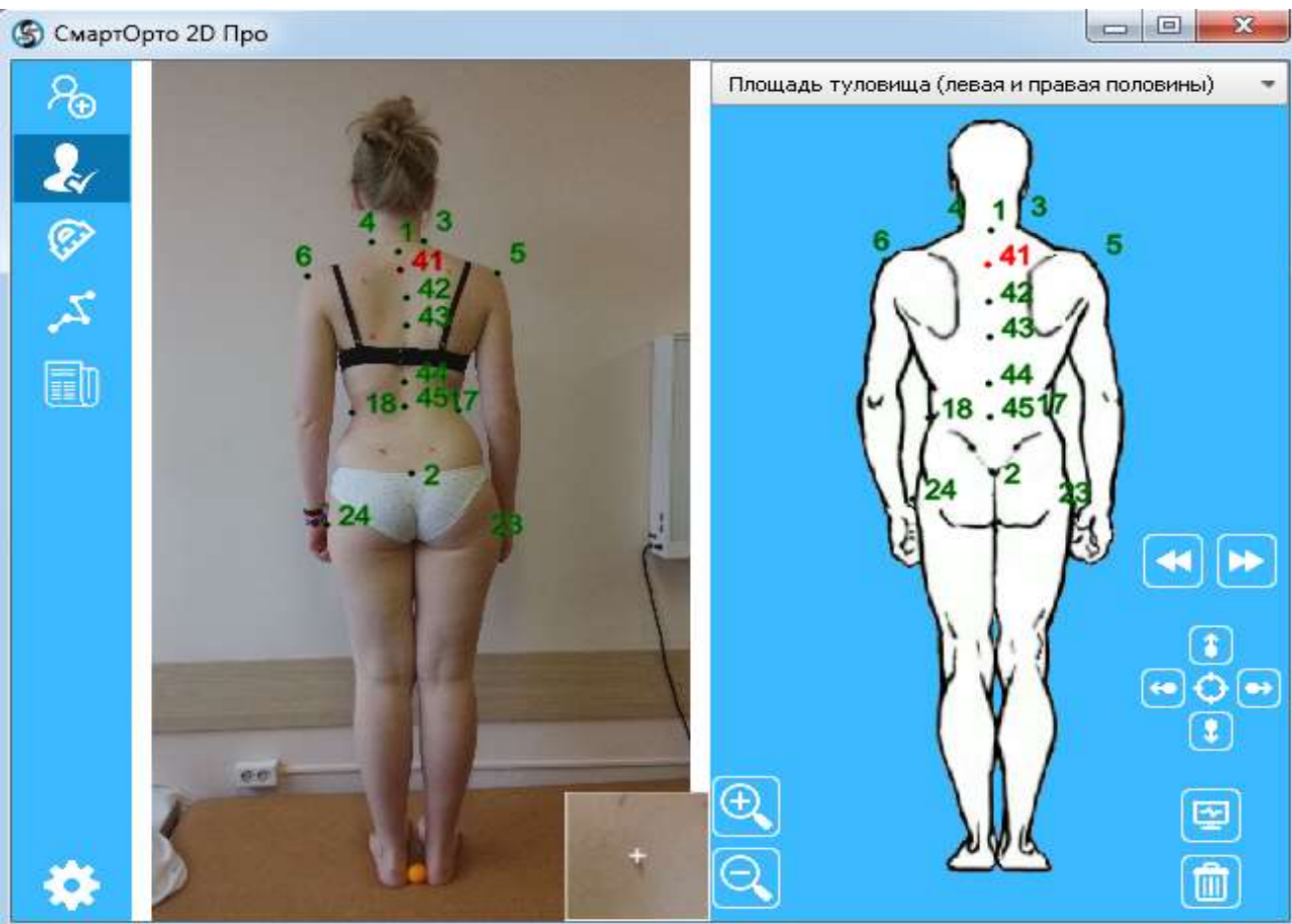


Раскраска в соответствии с паравертебральной асимметрией





# SMART-ORTHO 2D

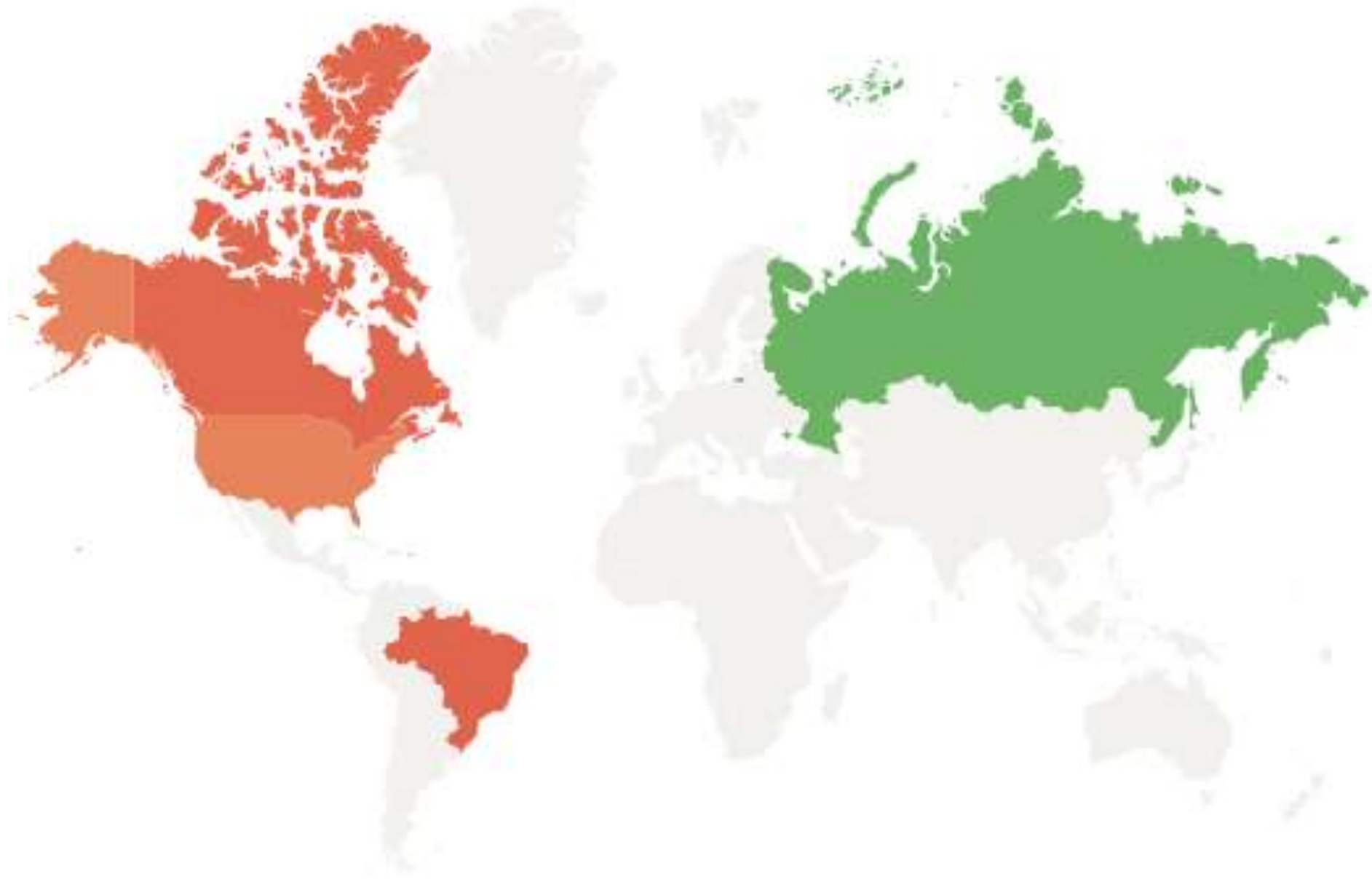






# GEOGRAPHY OF INTEREST TO THE SMART-ORTO 2D

(DATA ON AUGUST 2017)



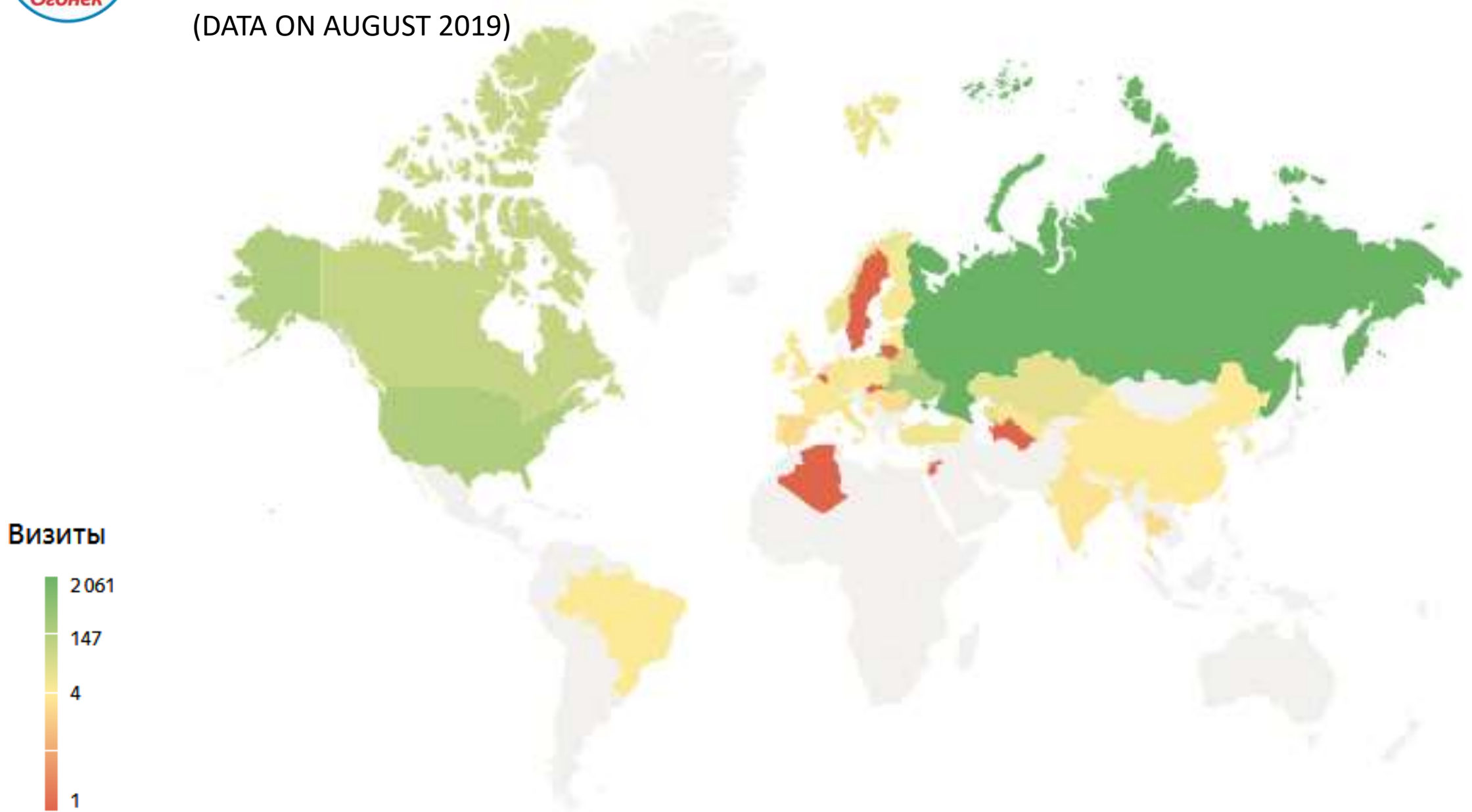
Визиты





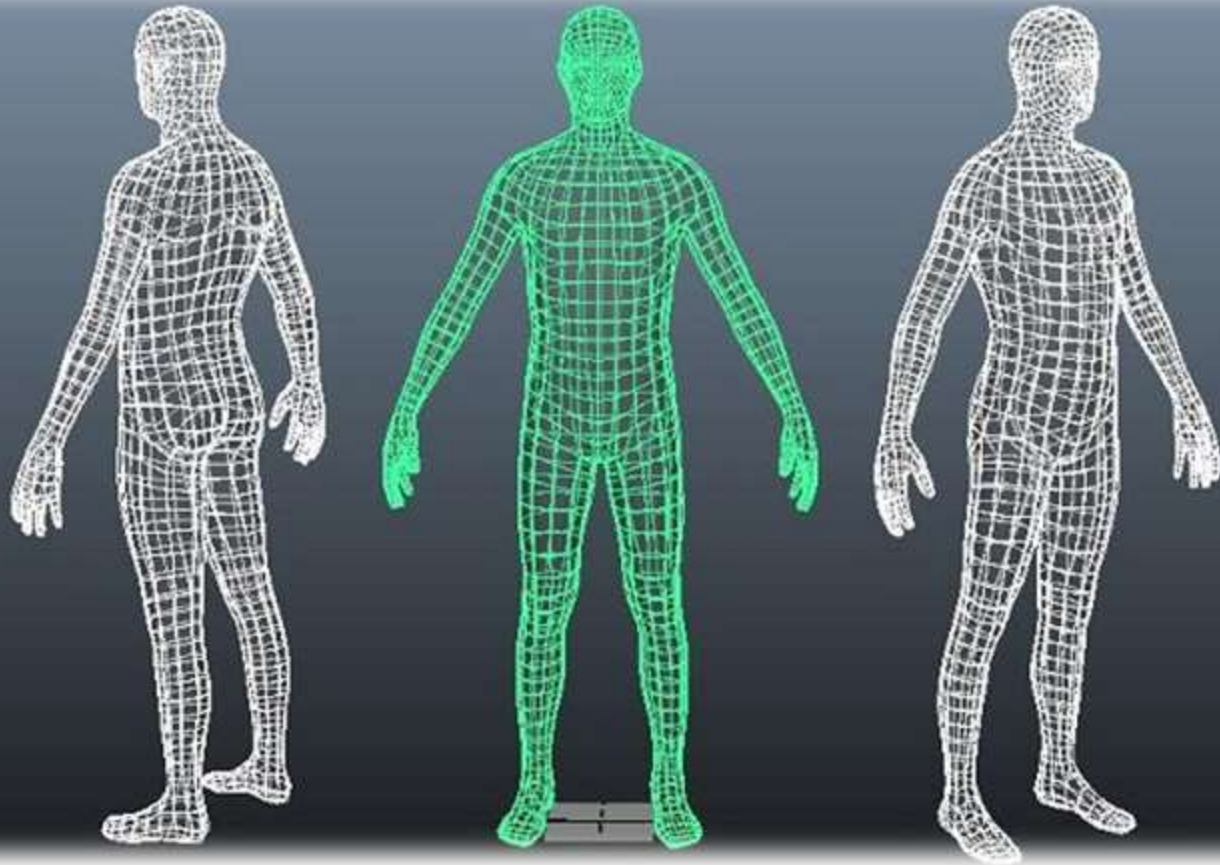
# GEOGRAPHY OF INTEREST TO THE SMART-ORTO 2D

(DATA ON AUGUST 2019)





# SMART-ORTO 3D





## MATERIALS AND METHODS SCANNER CHARACTERISTICS

- Looks like a big stapler
- Weight 0.7 kg
- Working distance from 20 to 160 cm
- 30 frames per second
- Minimum scanning area 20x20x20 cm
- Maximum scanning area 200x200x200 cm
- Accuracy  $\pm 1$  mm







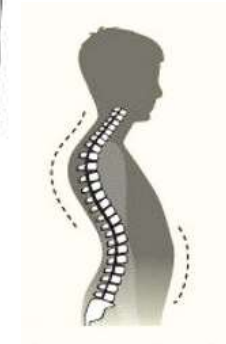
## MATERIALS AND METHODS

### CHARACTERISTIC OF CLINICAL MATERIAL

Our team studied the results of observation of randomly selected representative group of 62 patients Children's Center for Orthopedics and Traumatology 'Ogonyok' aged 12 to 17 years.

Most patients had posture defects:

- 42 patients with scoliotic posture,
- 15 patients with enlarged thoracic kyphosis,
- 5 patients with different lengths of the lower limbs.





## EXAMPLE OF A PATIENT SCAN WITH AIS

3D Systems Sense™

**Sense™**

КАДРИРОВ УСЕЧЬ СТЕРЕТЬ ОТВЕРДИТ ЦВЕТ

ПЕРЕЗАПУСТИТЬ СКАНИРОВА

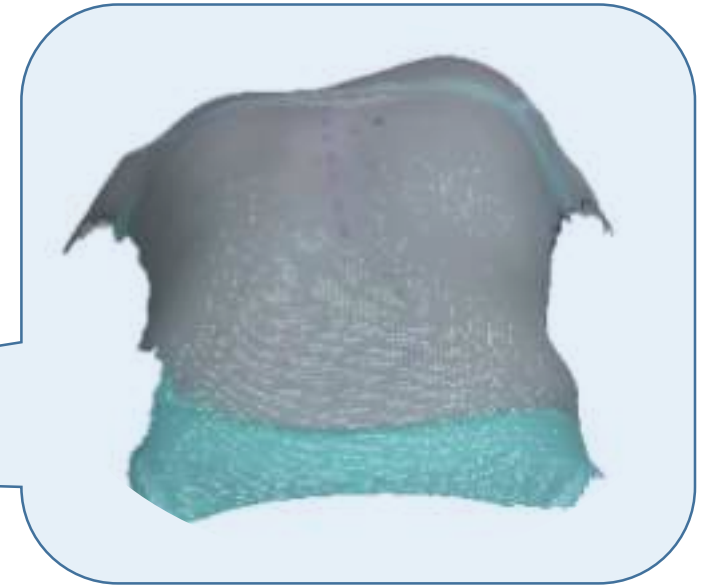
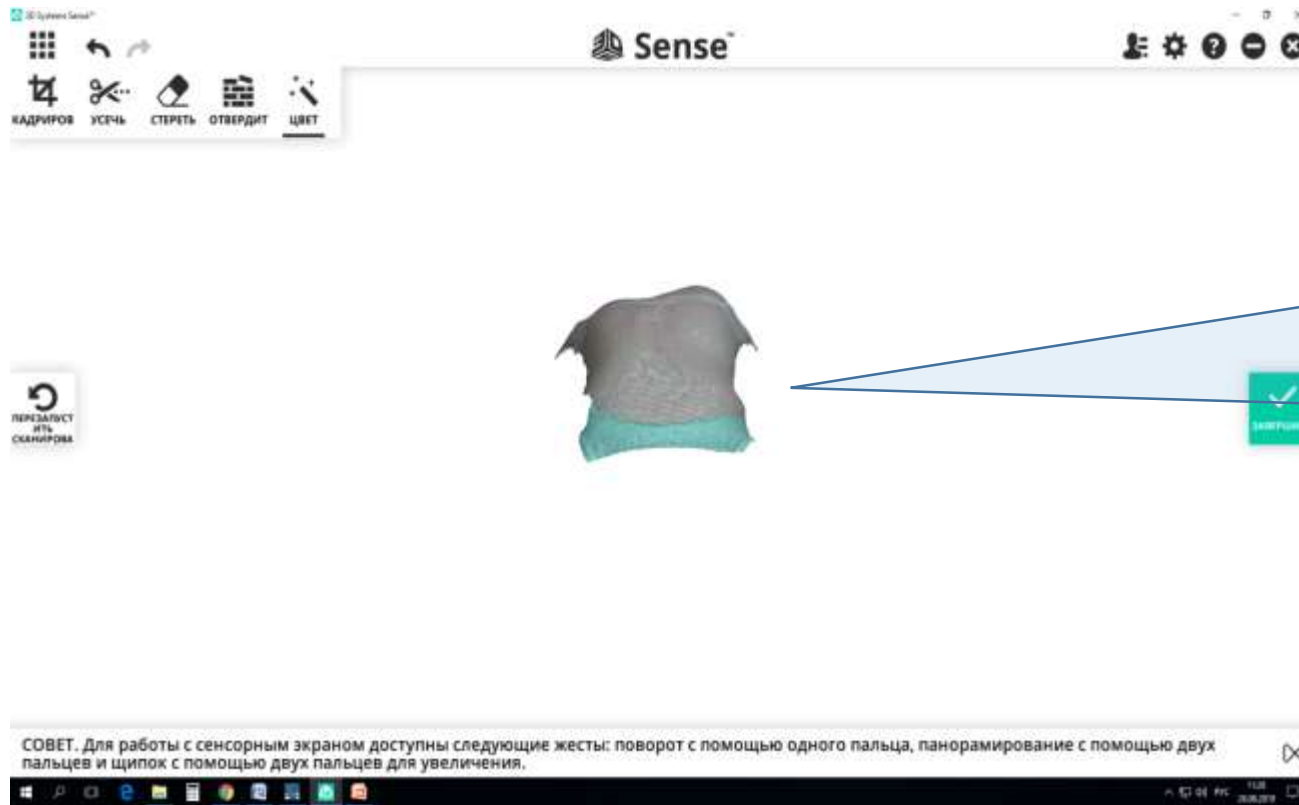
ЗАВЕРШИТЬ

СОВЕТ. Для работы с сенсорным экраном доступны следующие жесты: поворот с помощью одного пальца, панорамирование с помощью двух пальцев и щипок с помощью двух пальцев для увеличения.

11:29 26.08.2019

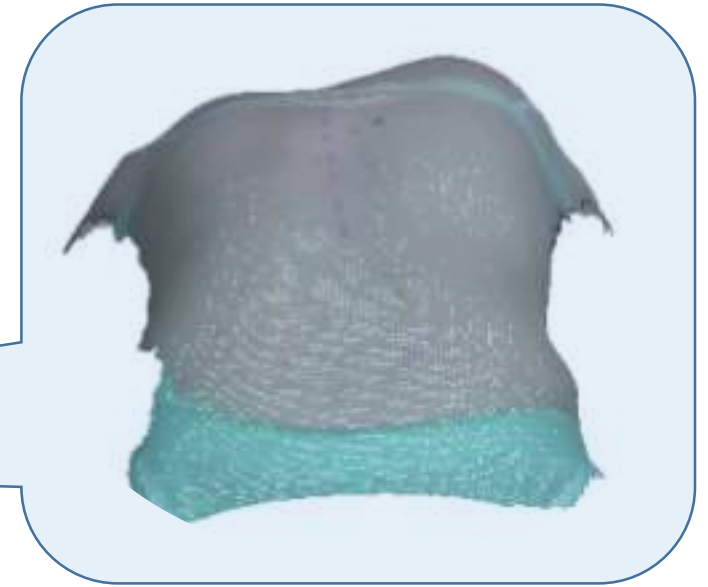
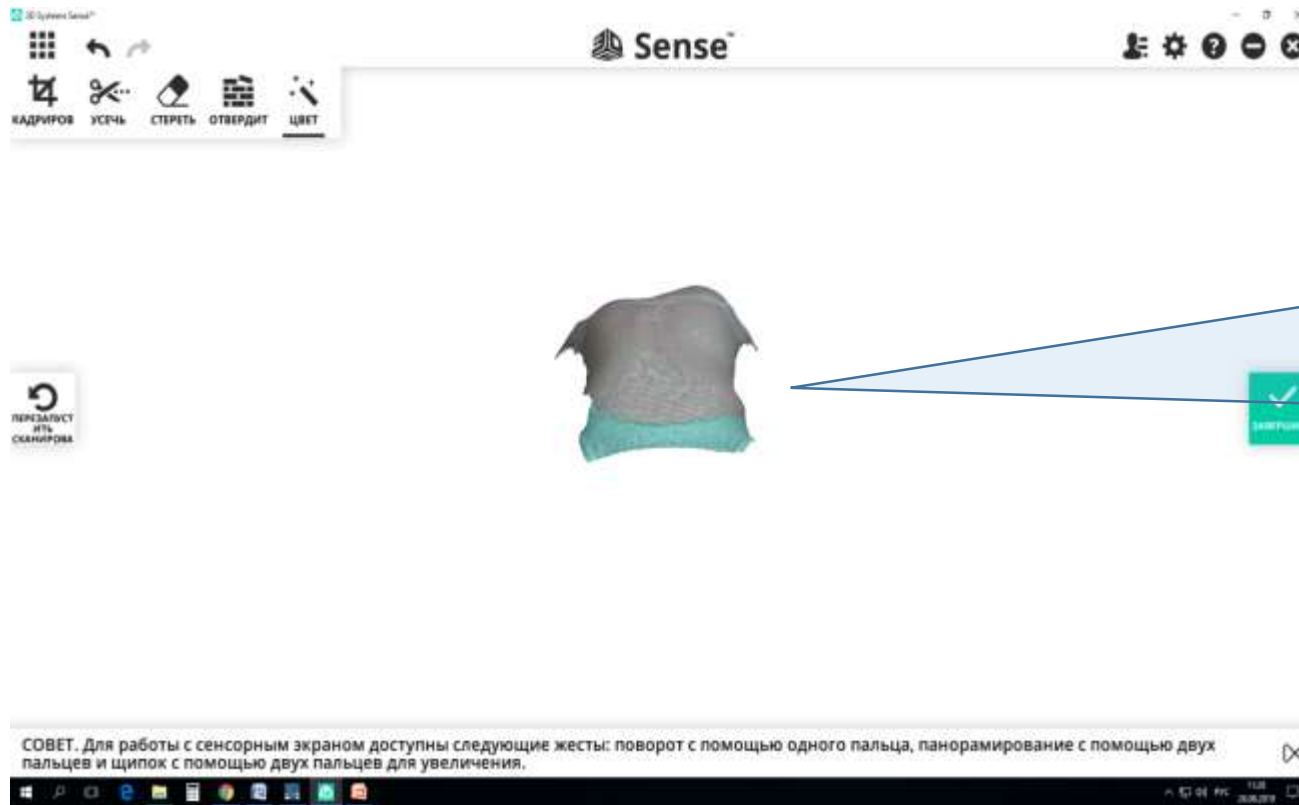


# EXAMPLE OF A PATIENT SCAN WITH AIS





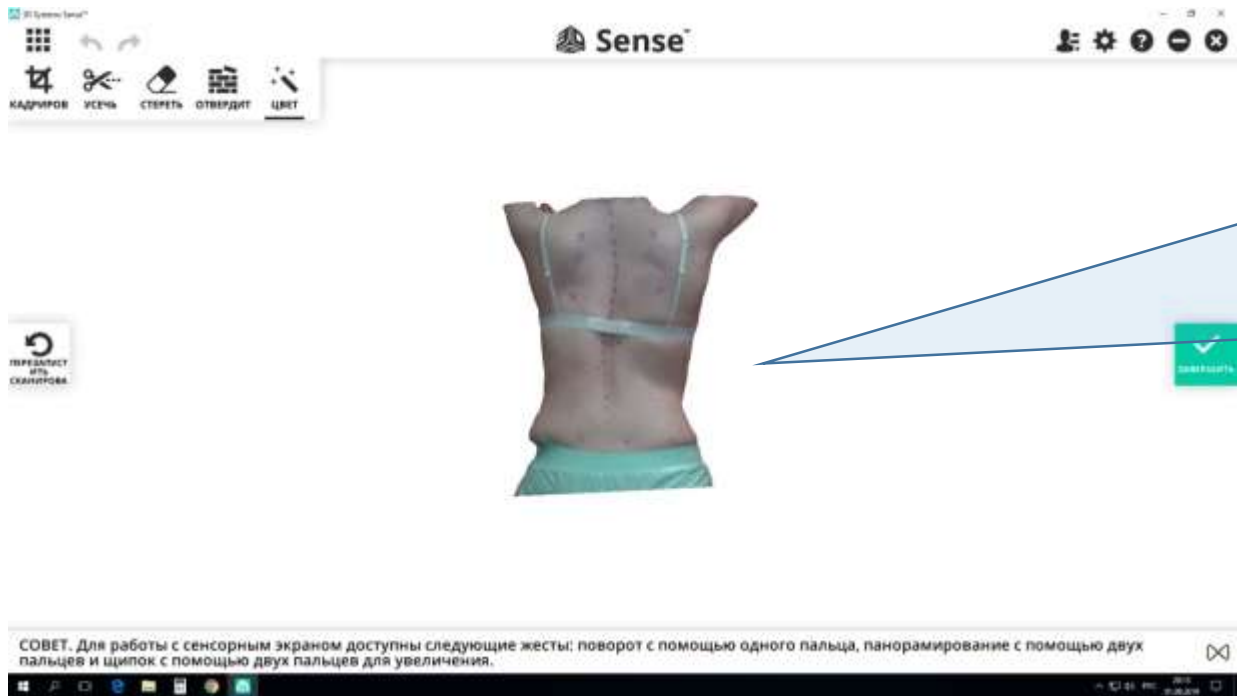
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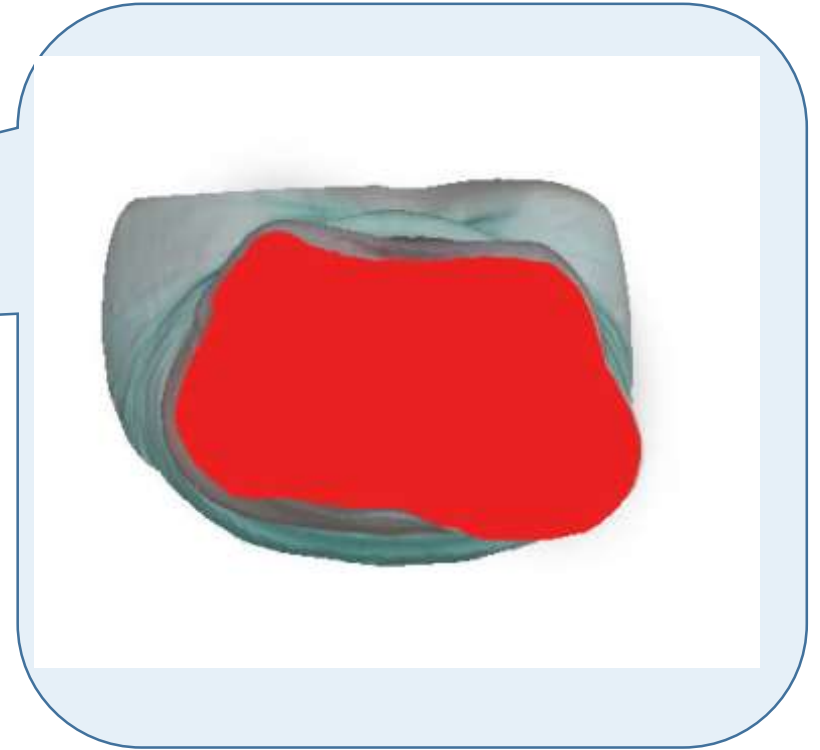
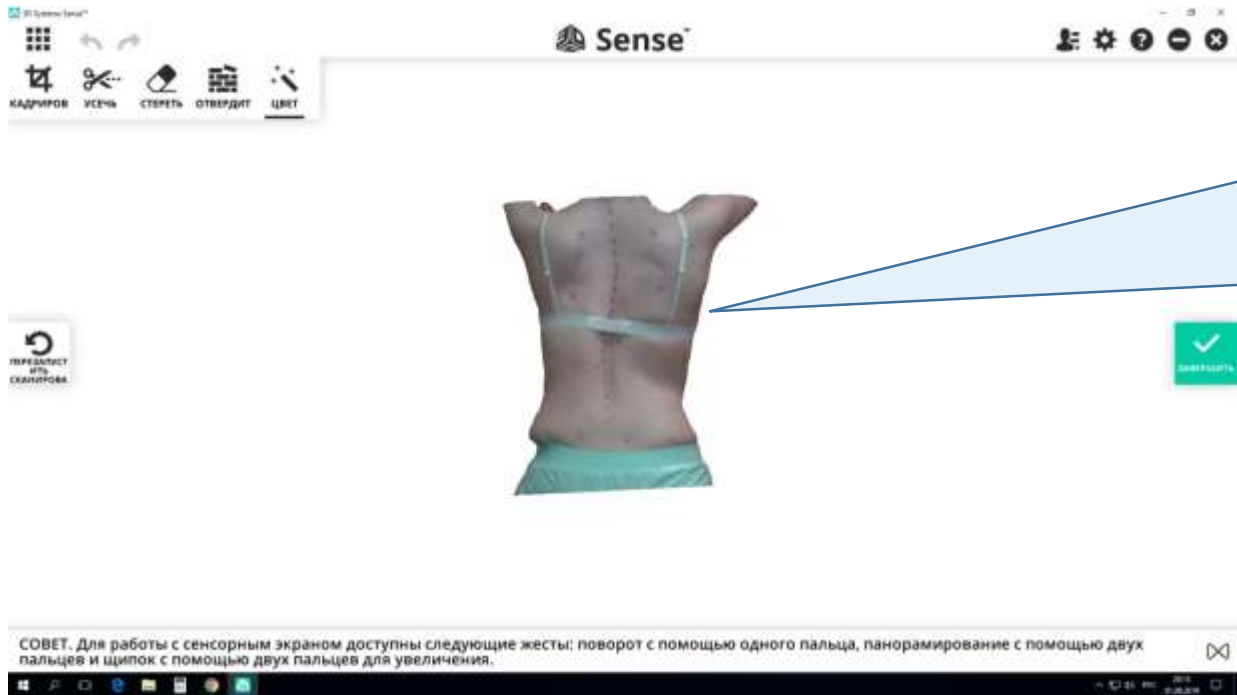


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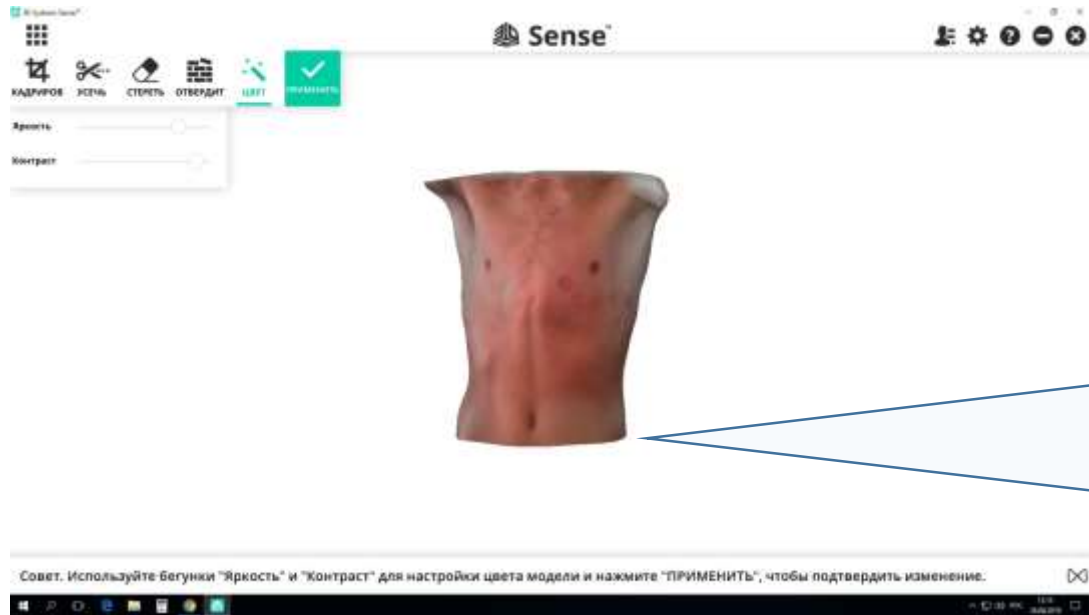


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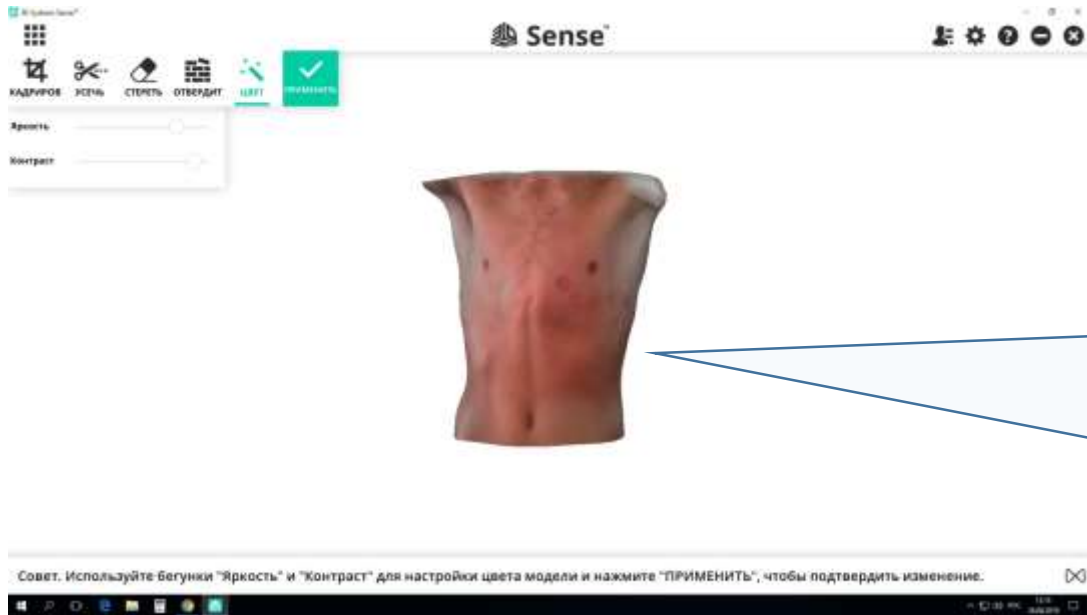


# EXAMPLE OF A SCAN OF A PATIENT WITH DEFORMATION OF THE BREAST CELL





# EXAMPLE OF A SCAN OF A PATIENT WITH DEFORMATION OF THE BREAST CELL







# EXAMPLE OF A PATIENT SCAN WITH HYPERKYFOSIS

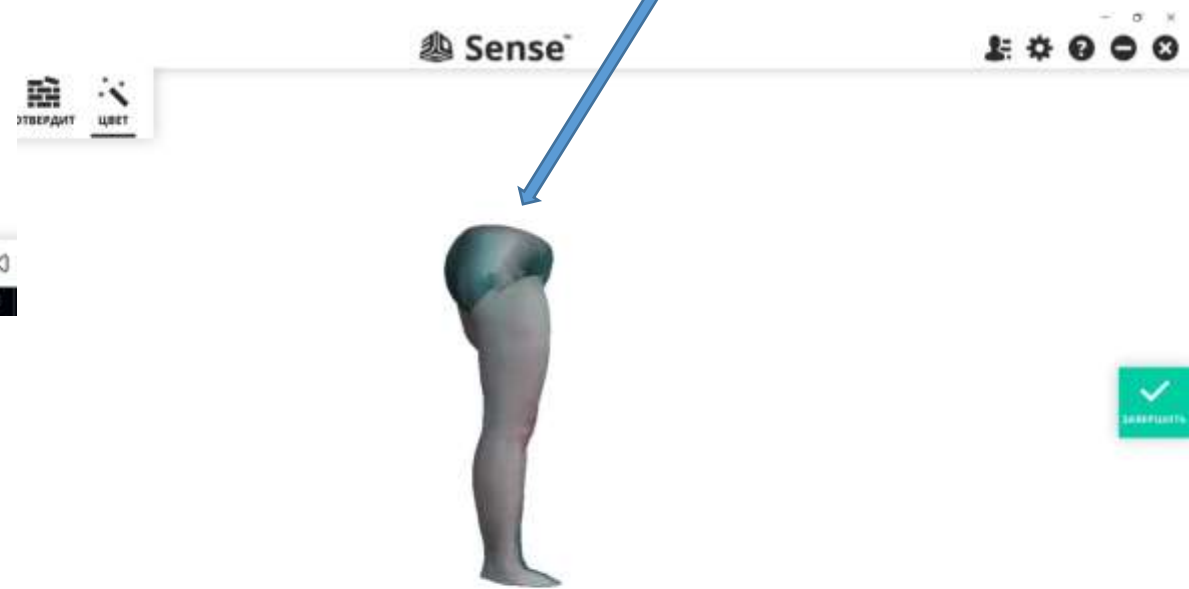
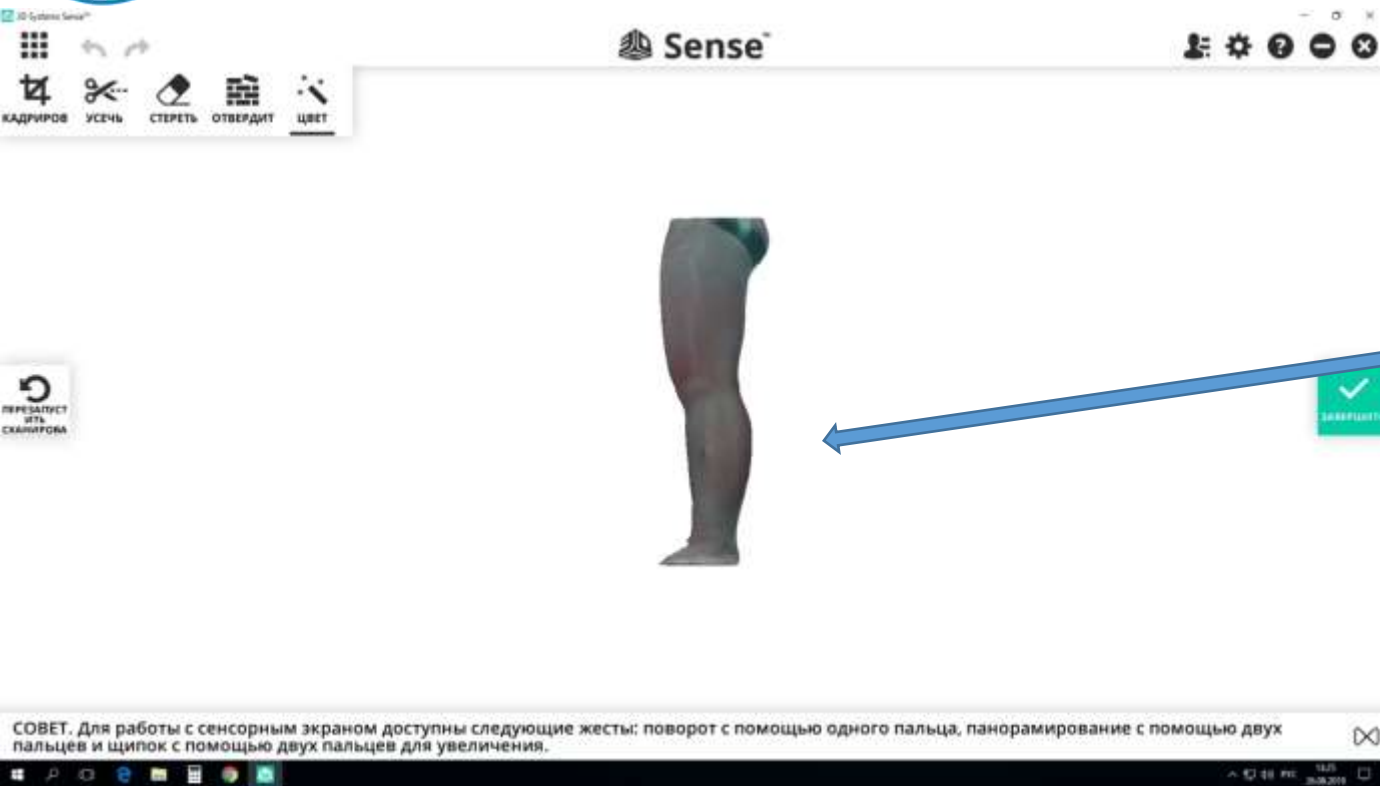


СС па  
СОВЕТ. Для работы с сенсорным экраном доступны следующие жесты: поворот с помощью одного пальца, панорамирование с помощью двух пальцев и щипок с помощью двух пальцев для увеличения.



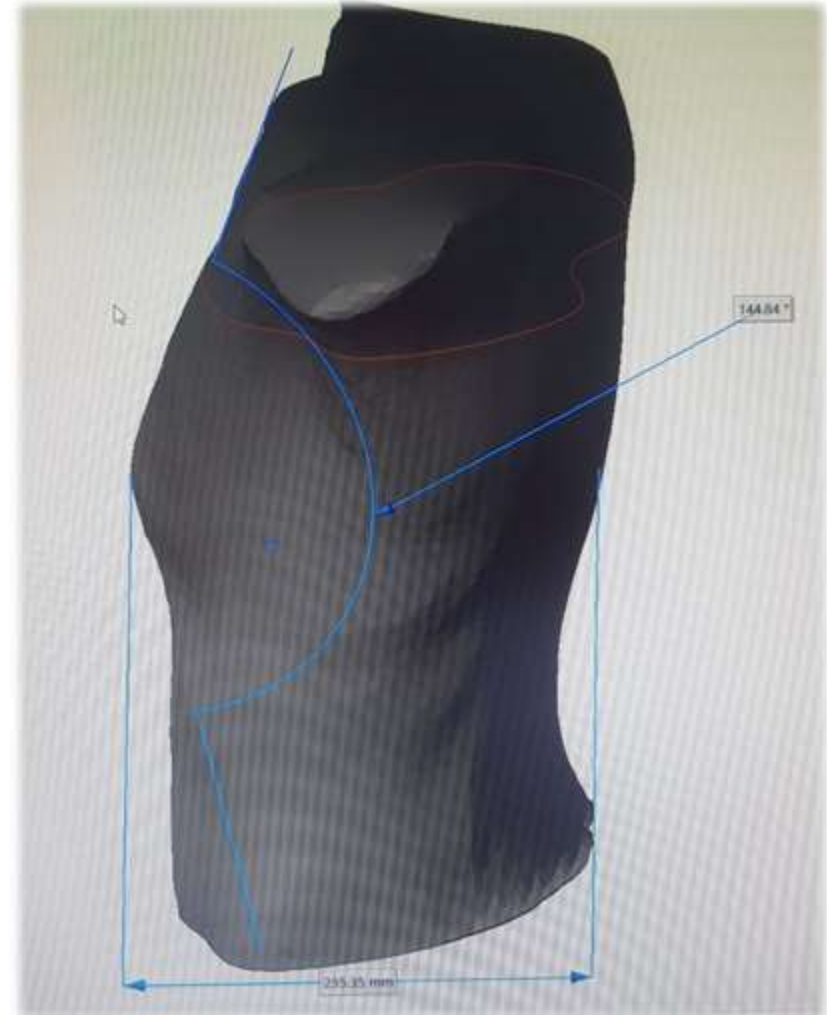


# EXAMPLE OF PATIENT SCAN WITH SHORTING FOOT





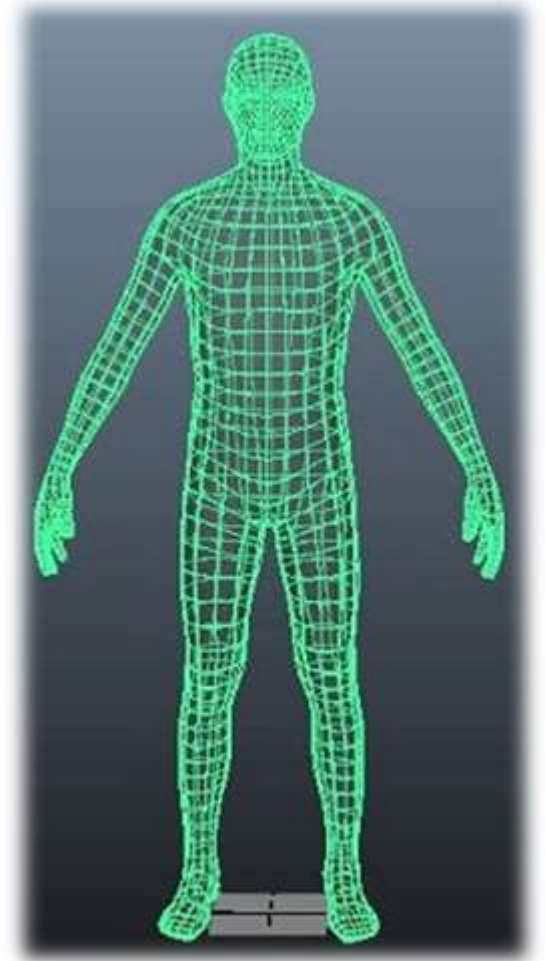
# RUNNING MEASUREMENTS STANDARD PACKAGE (Netbabb basic).





## CONCLUSION

- Modern 3D scanners are applicable for diagnosis in pediatric orthopedics.
- Use is limited by the lack of specialized software.
- The hardware-software complex will be available for widespread use.





*DĚKUJI  
ZA POZORNOST!*

*THANK YOU FOR YOUR  
ATTENTION!*

