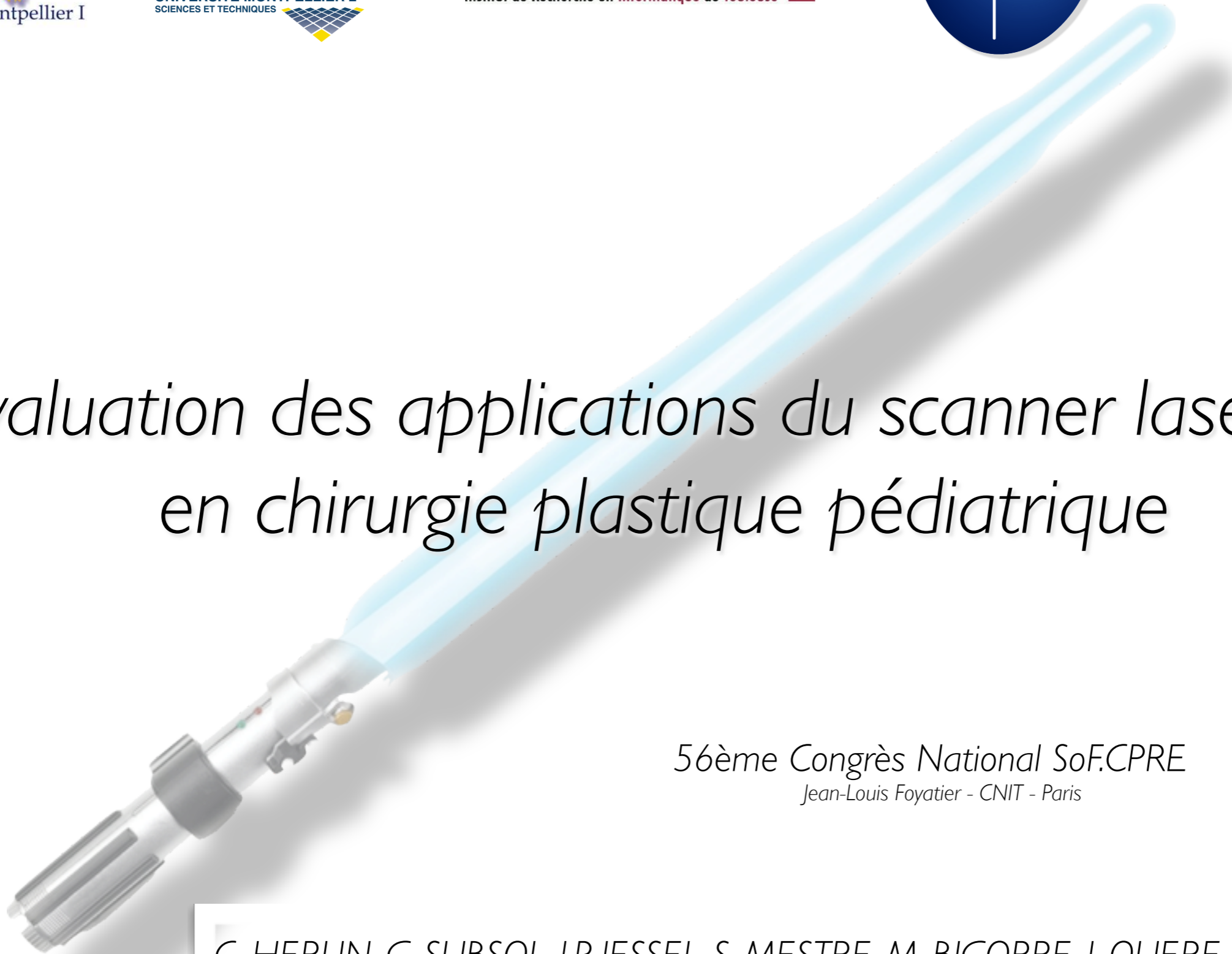


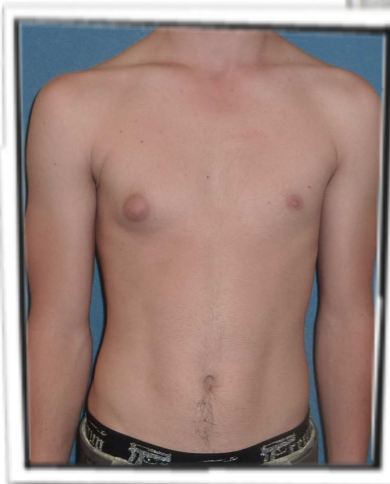
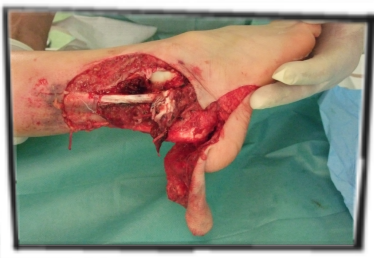
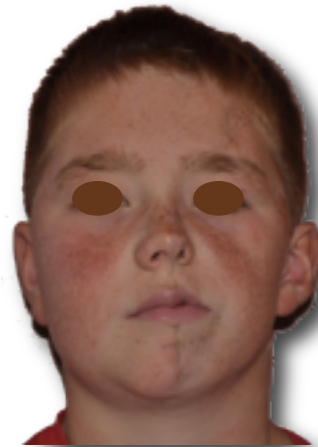
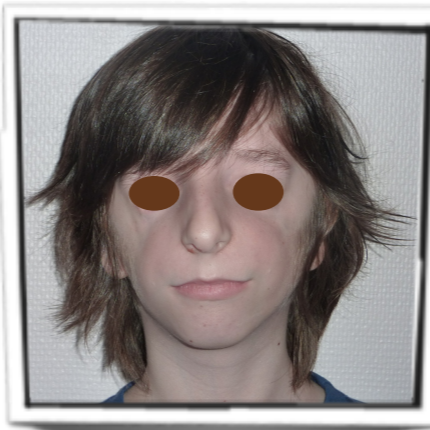
Évaluation des applications du scanner laser 3D en chirurgie plastique pédiatrique



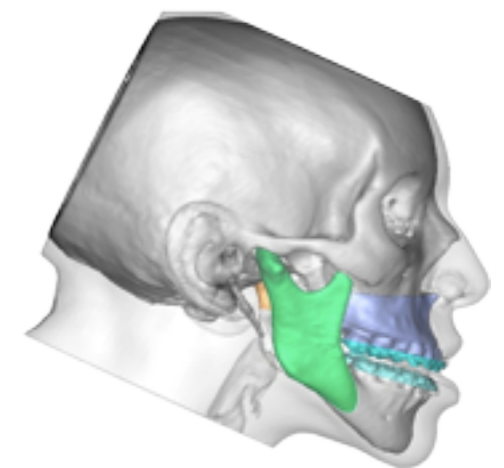
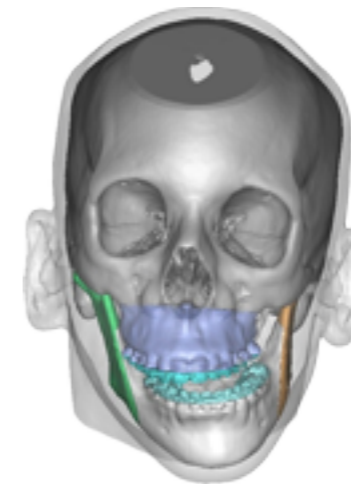
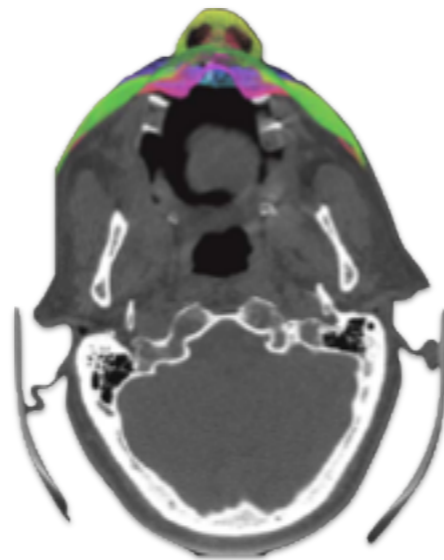
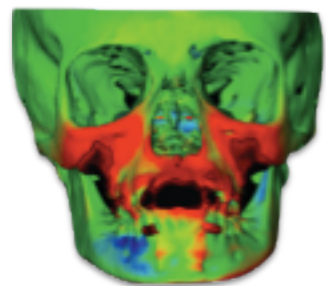
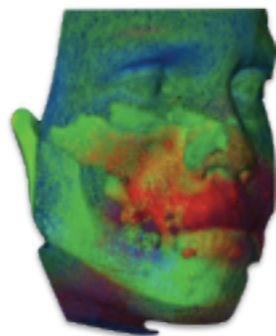
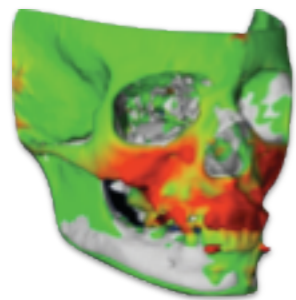
56ème Congrès National SoF.CPRE
Jean-Louis Foyatier - CNIT - Paris



C. HERLIN, G. SUBSOL, J.P. JESSEL, S. MESTRE, M. BIGORRE, I. QUERE, G. CAPTIER
(Montpellier, Toulouse)



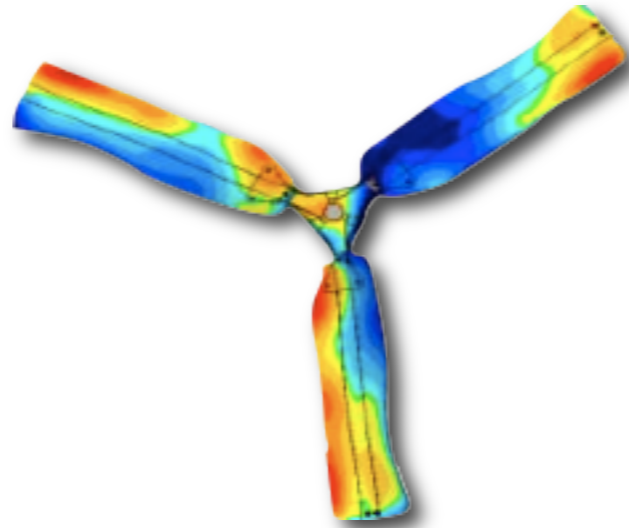
IMAGERIE SQUELLETIQUE



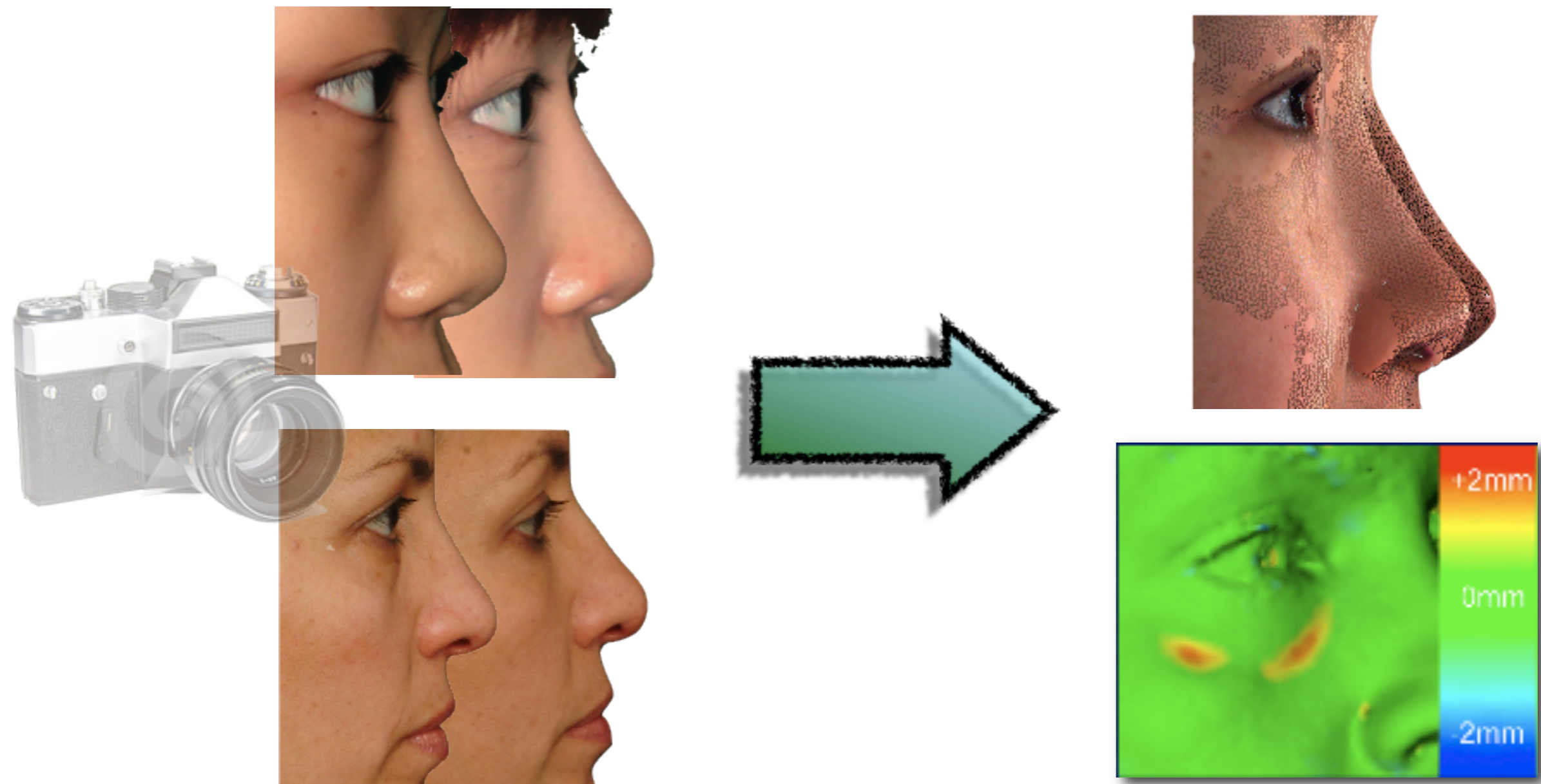
Jonathan M Sykes et al., « 3D Analysis of Dentofacial Deformities: A New Model for Clinical Application », *Facial Plastic Surgery Clinics of North America* 19, n° 4 (novembre 2011): 767-771.

Lucia H C Cevidanes et al., « Cranial base superimposition for 3-dimensional evaluation of soft-tissue changes », *American Journal of Orthodontics and Dentofacial Orthopedics: Official Publication of the American Association of Orthodontists, Its Constituent Societies, and the American Board of Orthodontics* 137, n° 4 (avril 2010): S120-129.

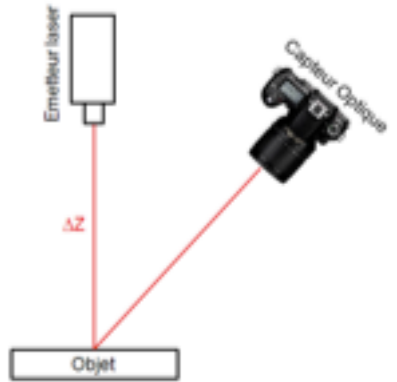
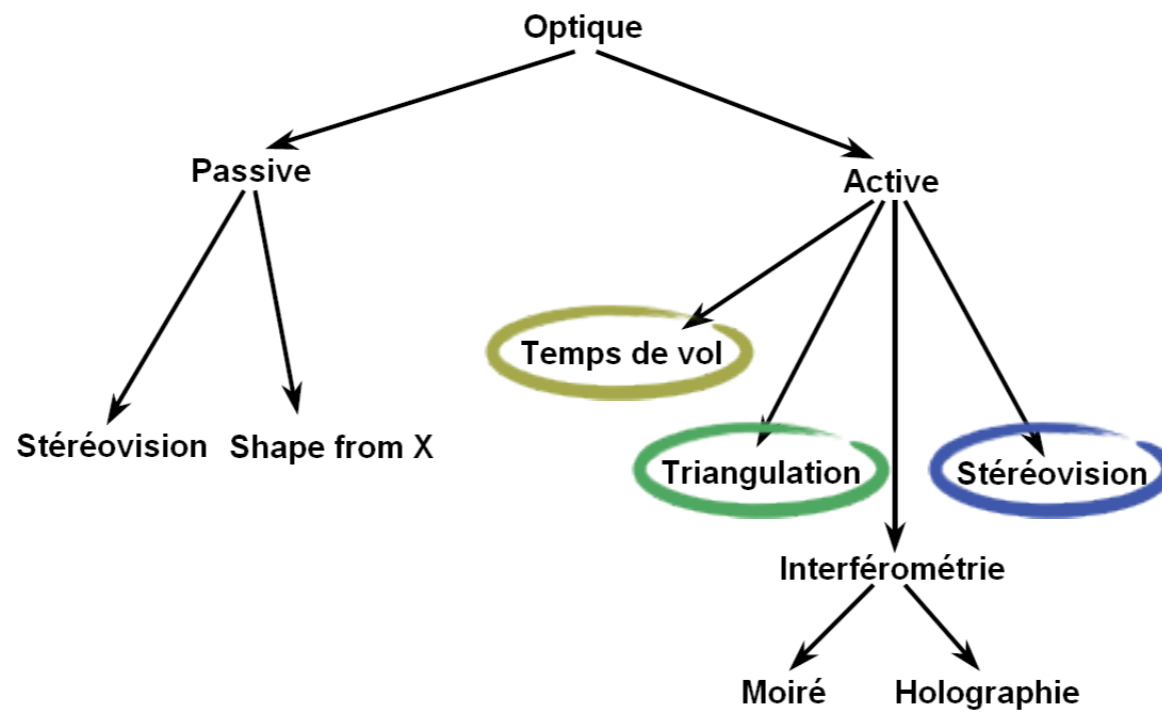
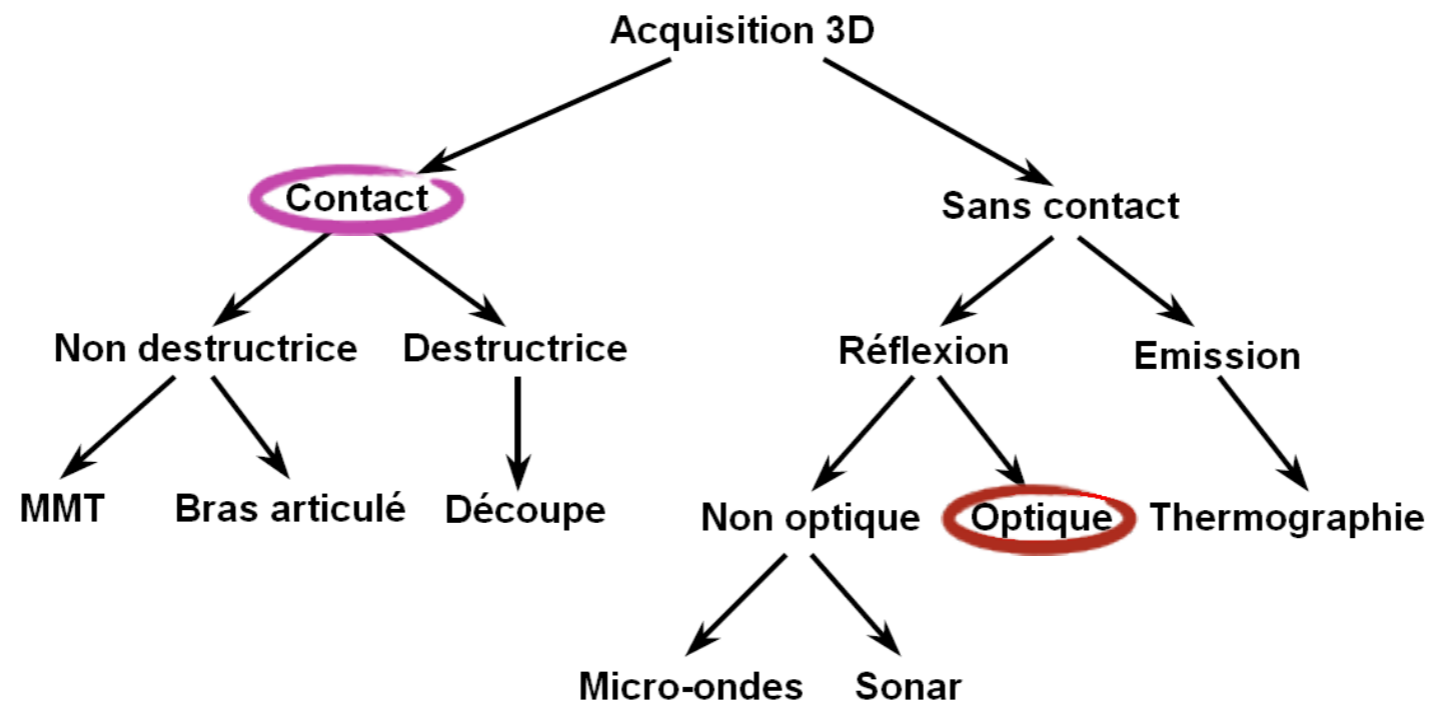
APPLICATIONS INDUSTRIELLES



Comment remplacer nos photos numériques par des images comportant des données quantitatives ???



METHODES D'ACQUISITION



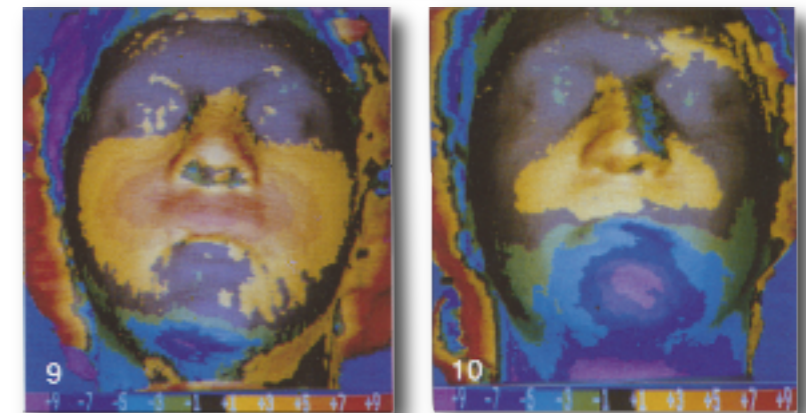
HISTORIQUE

1944: Etude de la séquence de Pierre Robin et d' un adulte porteur d' une Microsomie Hémifaciale



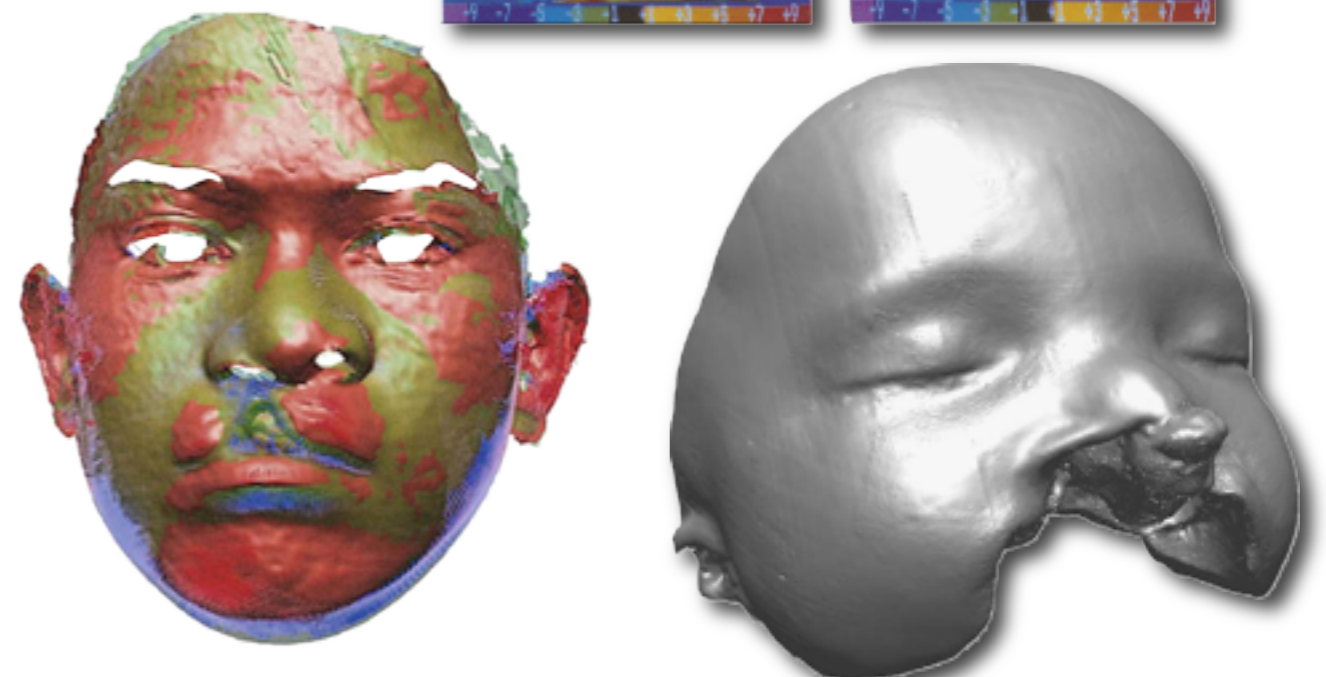
1967: Etude des Fentes Labio-Maxillo-Palatine

1988: Etude de la croissance des tissus mous chez l' adolescent

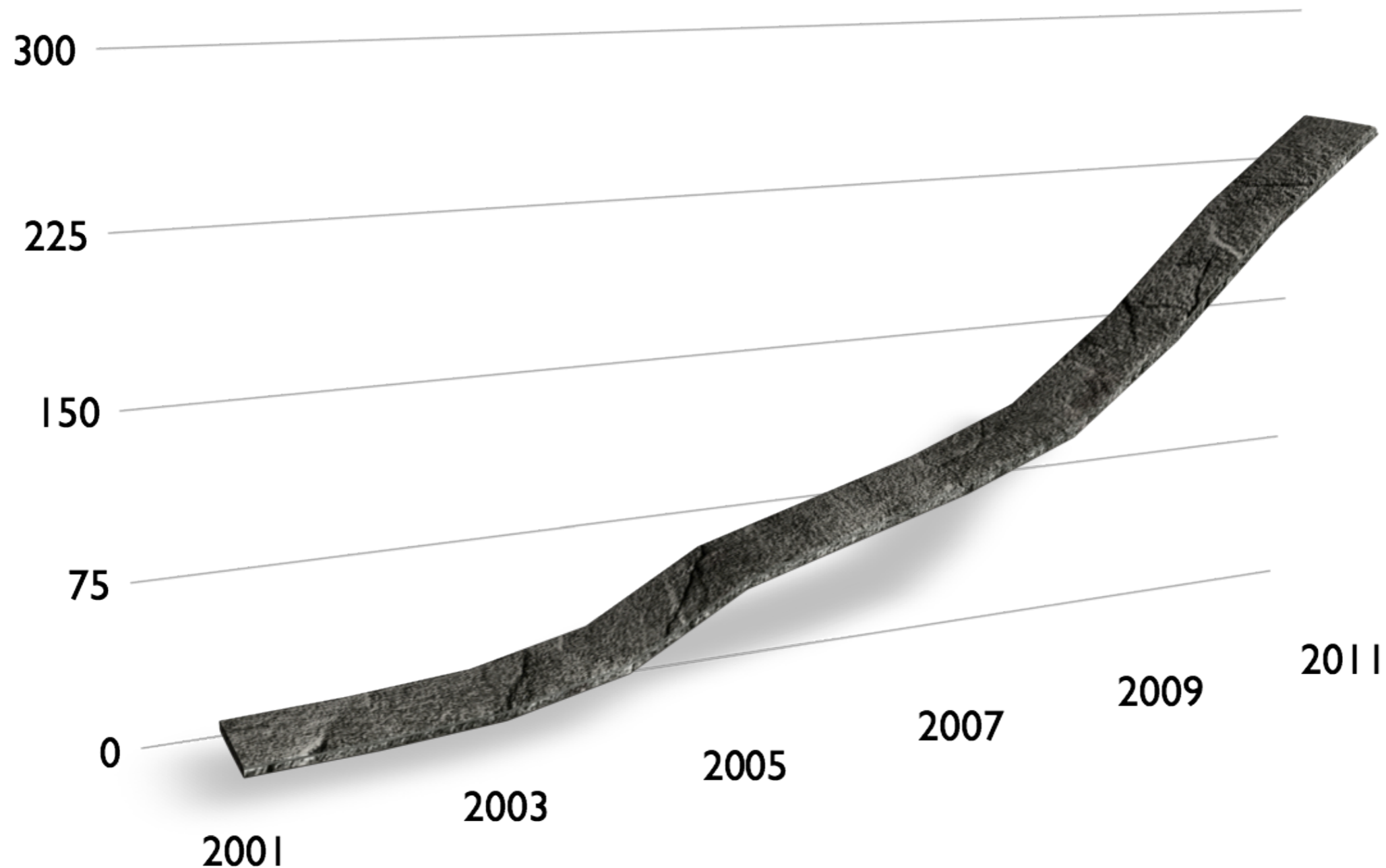


1996: Etude de la conséquence d' un Lefort I: FLPBT vs FLPUT

2010: Plus rapide, Plus précis (< 0,05 mm), Portatif



Augmentation importante du nombre de publications durant les 10 dernières années



NOTRE EXPÉRIENCE

Konica Minolta® Vivid 910



Creaform® RevScan



Artec® MHT



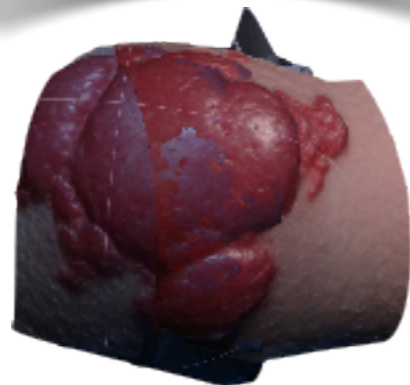
LifeViz® Micro



Efficacité de traitement

Autogreffe adipocytaire

Hémangiome



Treacher Collins



MHF







Parry Romberg



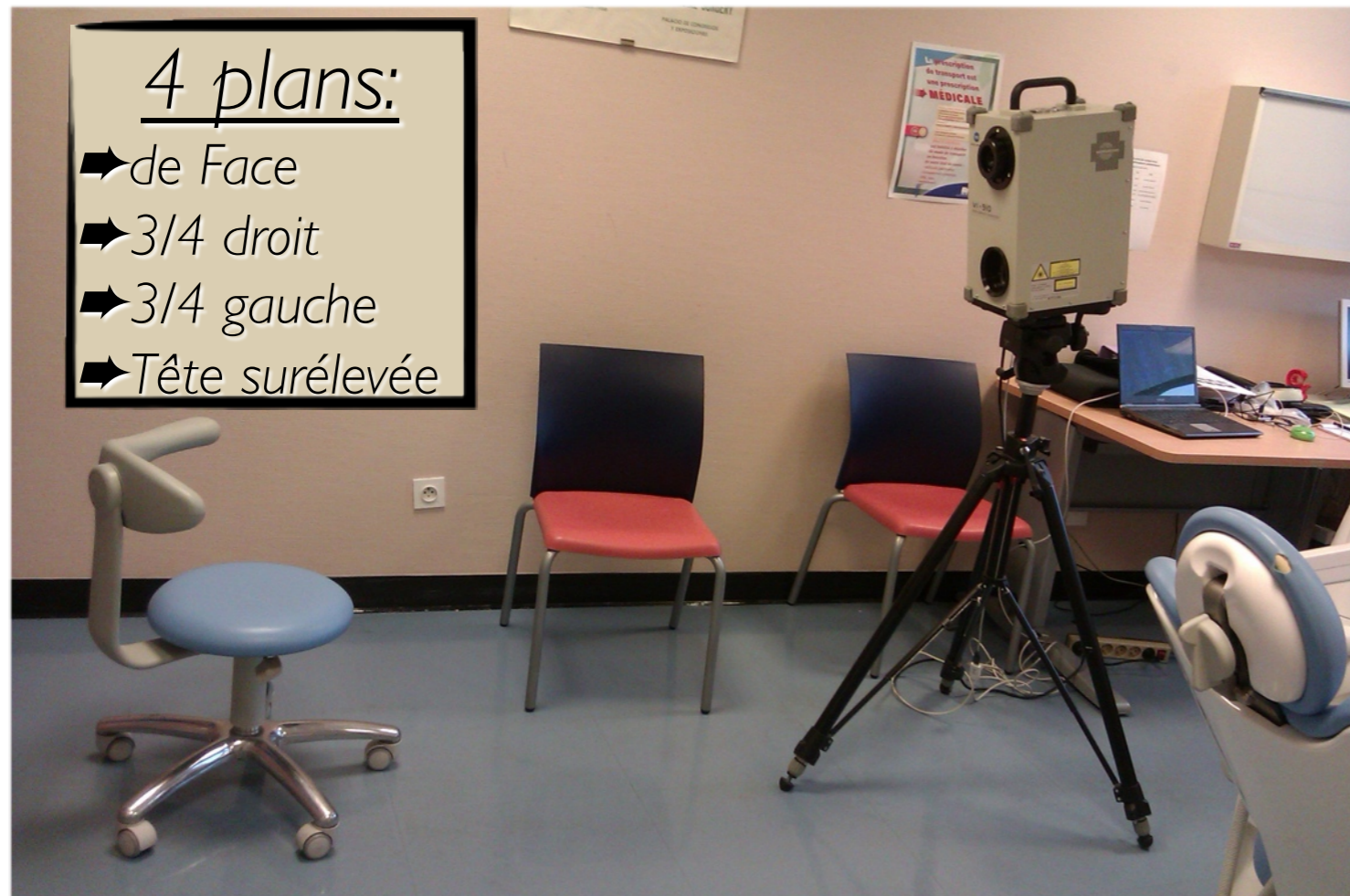
1: Faisabilité de la méthode chez le nourrisson

2: Evolution d'autogreffes adipocytaires

NOTRE EXPÉRIENCE

Modèle	Principe	Vitesse d'acquisition	Précision	Installation	Prix
	Triangulation active par lumière structurée (ligne) Balayage objet autour de la source Pas de calibration	Annoncé: 150 000 pps	Théorique: 0,2 mm	Un trépied une chaise Peu mobile	30 000 €
		Mesuré: Rapide	Importante		
	Triangulation active par lumière structurée (croix) Balayage source autour de l'objet Calibration	Annoncé: 18 000 pps	Théorique: 0,6 mm	1,3 Kg Peu maniable	60 000 €
		Mesuré: Lente	Suffisante		
	Triangulation active par lumière structurée (grille) Balayage source autour de l'objet Pas de calibration	Annoncé: 500 000 pps	Théorique: 0,6 mm	1,4 Kg Maniable	15 000 €
		Mesuré: Très rapide	Parfois insuffisante en pédiatrie		
	Stéréovision	Annoncé: 0,08s	Théorique: <0,05 mm	1 Kg Maniable	13 000 €
		Mesuré: Instantanée	Très importante		

NOTRE EXPÉRIENCE



Recalage des Maillages

MeshLab (open source)

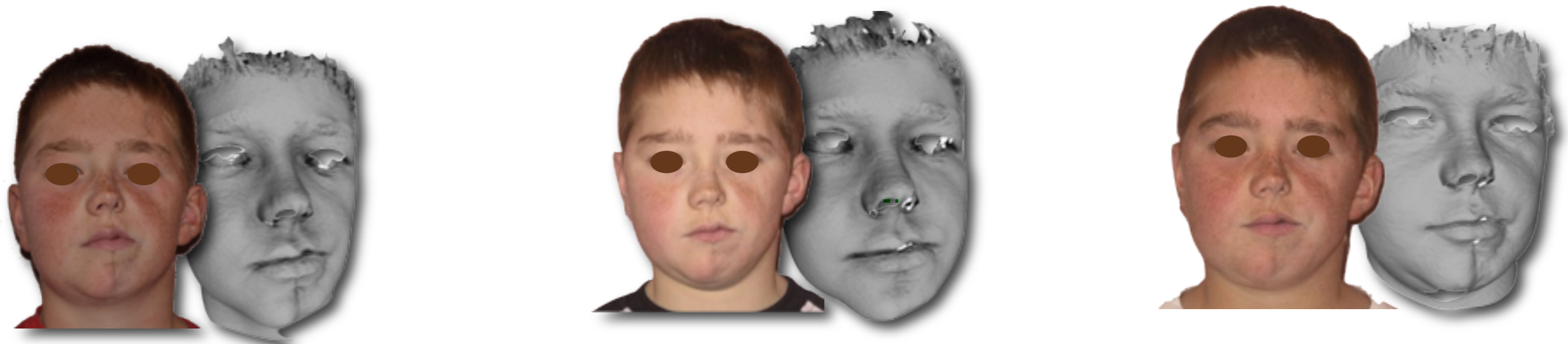


Calcul de distances

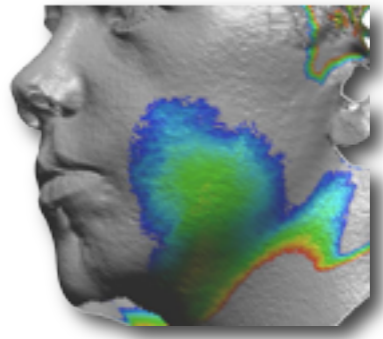
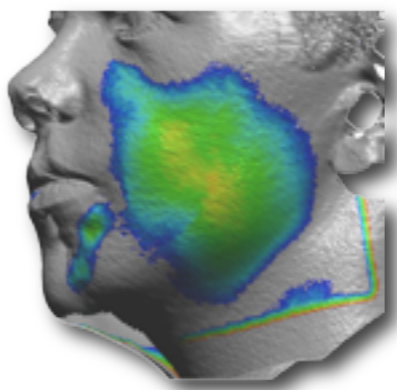
CloudCompare (open source)



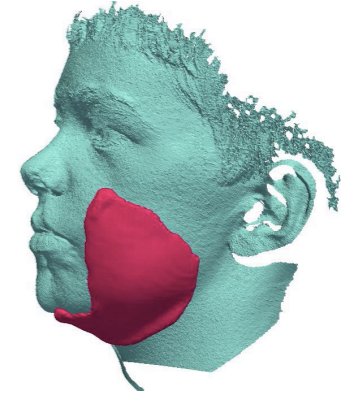
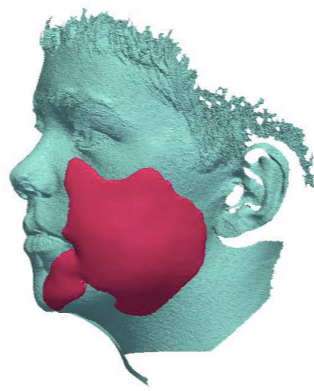
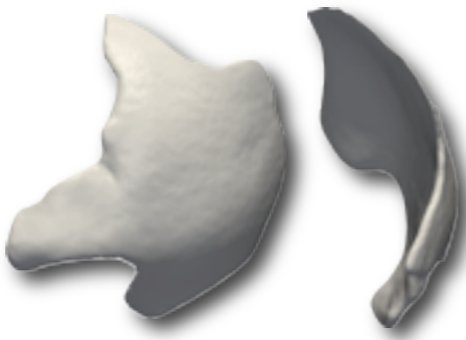
MALADIE DE PARRY-ROMBERG



Répartition topographique



Calcul de volume

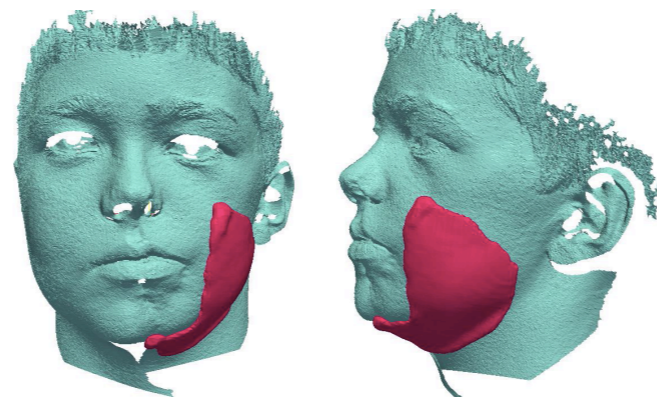
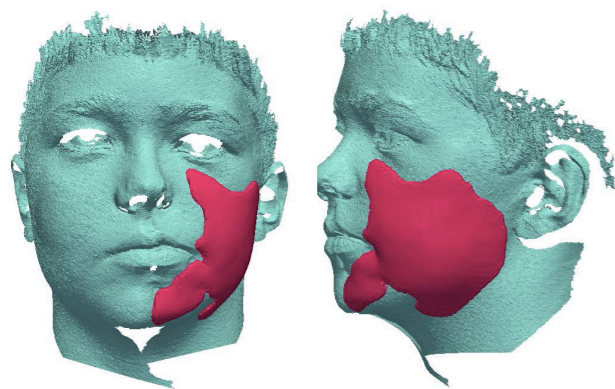


Volume injecté:
26 cm³

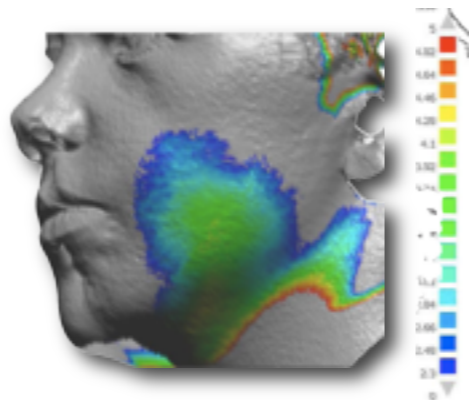
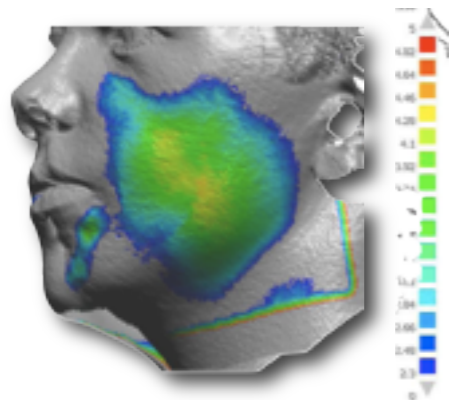
à 7 jours:
21 cm³ (-19%)

à 6 mois:
17 cm³ (-35%)

MALADIE DE PARRY-ROMBERG



① Réelle fonte graisseuse?



② Ptose précoce?

- ① Probable surestimation de la fonte par l'échelle (2,3 - 5mm) utilisée et par non évaluation de la graisse distribuée dans les loges profondes
- ② Probable surestimation de la redistribution graisseuse effective

MAIS

- Permet de suivre une évolution souvent imperceptible en photographie
- Plus en adéquation avec la clinique qu'une IRM ou une TDM

HEMANGIOME INFANTILE

Méthode de *triangulation* rapide
MAIS

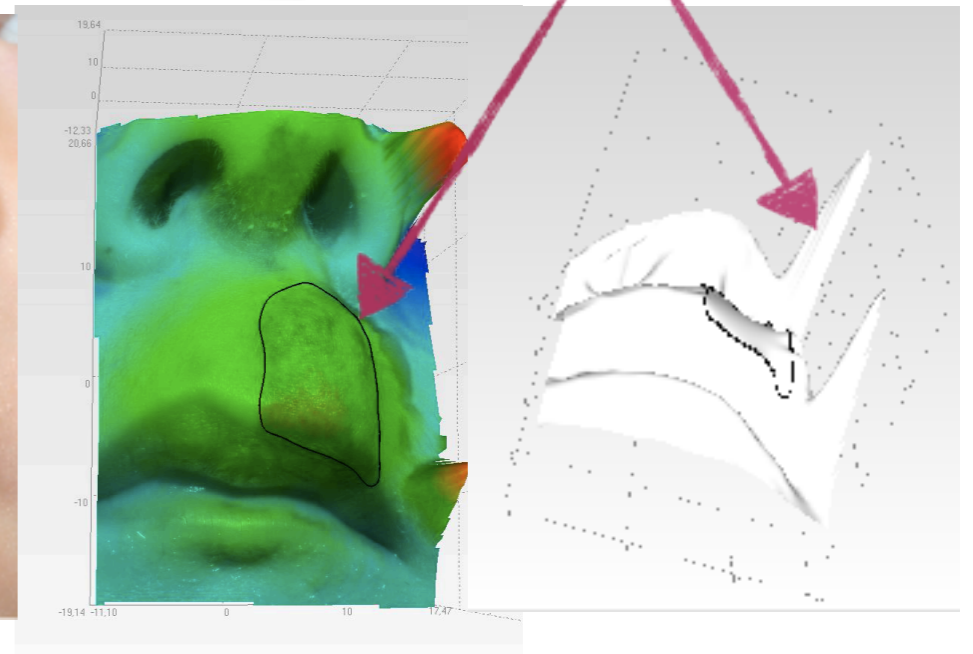
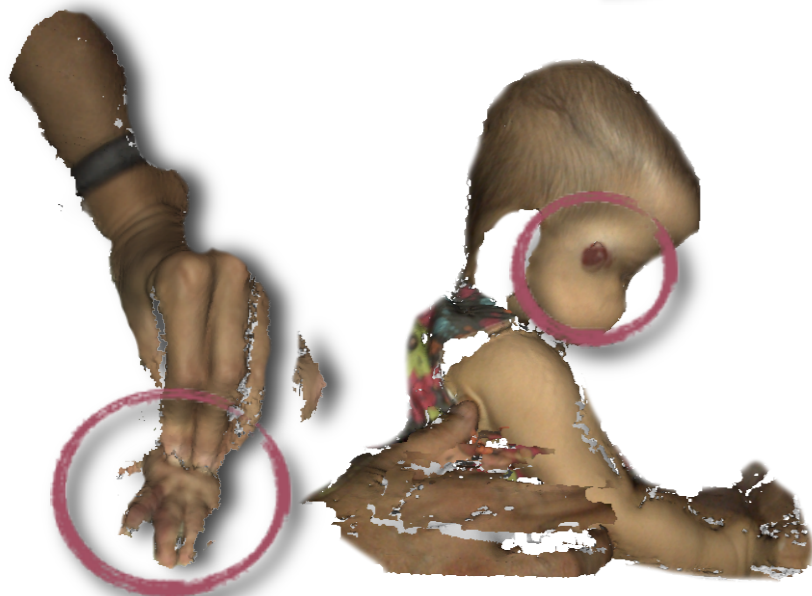
Champ de vue trop important et
Temps d'acquisition trop longs

Intérêt des méthodes de
stéréophotogrammétrie
à petit champ de vue et
Acquisition instantanée

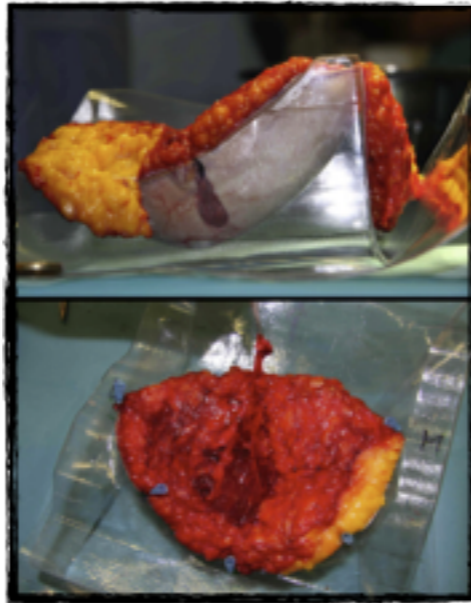
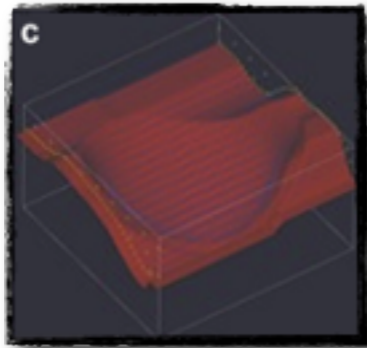
PHRC national:
Dr. Michèle Bigorre



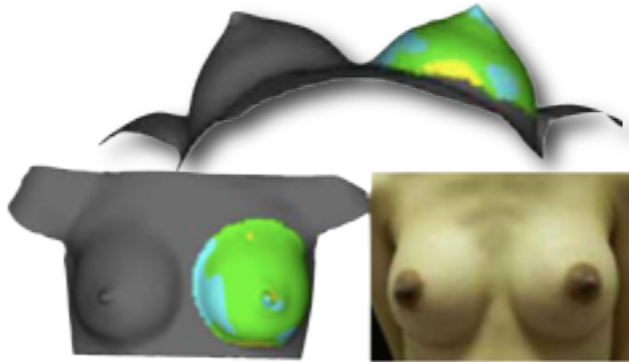
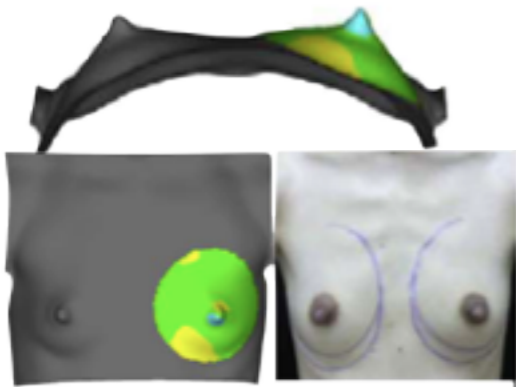
156 mm³ !!!



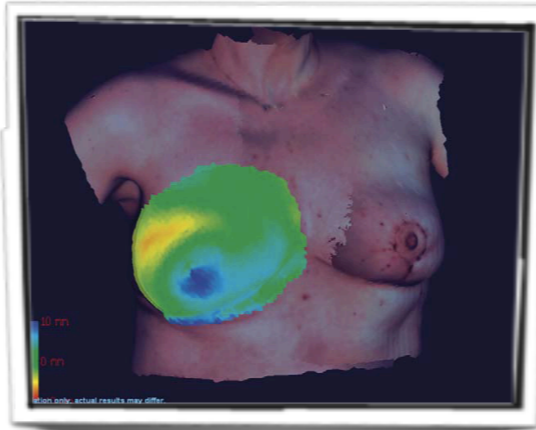
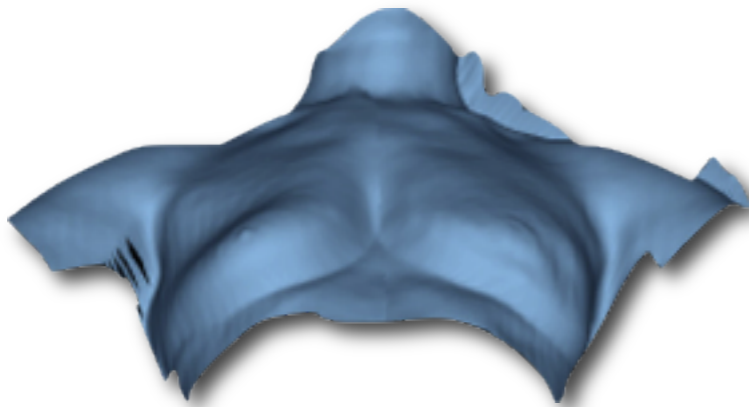
APPLICATIONS



Guides de symétrisation
en
Reconstruction Mammaire



Evaluation de l'effet et
des Prothèses Mammaires



Quantification et
Evaluation de
L'autogreffe Adipocytaire

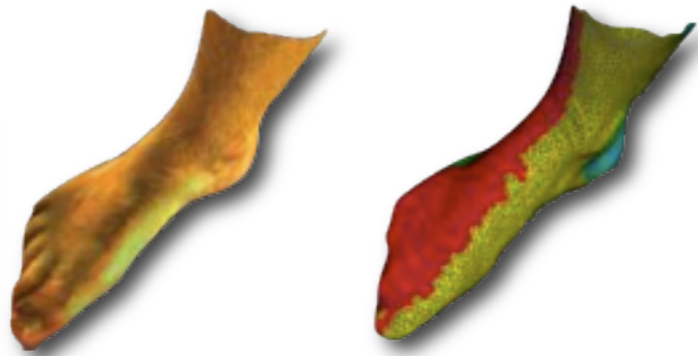
Raphael Sinna et al., « Breast fat grafting (lipomodelling) after extended latissimus dorsi flap breast reconstruction: a preliminary report of 200 consecutive cases », *Journal of Plastic, Reconstructive & Aesthetic Surgery: JPRAS* 63, n° 11 (novembre 2010): 1769-1777.

S Garson et al., « [3 D evaluation and breast plastic surgery: preliminary study] », *Annales De Chirurgie Plastique Et Esthétique* 50, n° 4 (août 2005): 296-308.

Shuh-Ping Sun, Ko-Wen Hsu, et Jing-Shyr Chen, « Postoperative evaluation platform of female breast implant surgery with breast configuration indicator », *Computers in Biology and Medicine* 39, n° 7 (juillet 2009): 595-603.

Uros Ahcan et al., « The use of 3D laser imaging and a new breast replica cast as a method to optimize autologous breast reconstruction after mastectomy », *Breast (Edinburgh, Scotland)* (octobre 6, 2011)

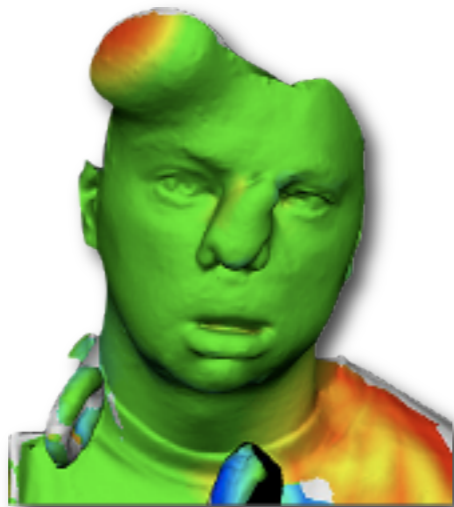
APPLICATIONS



Evaluation d'une Perte de Substance
⇒ Choix d'un lambeau

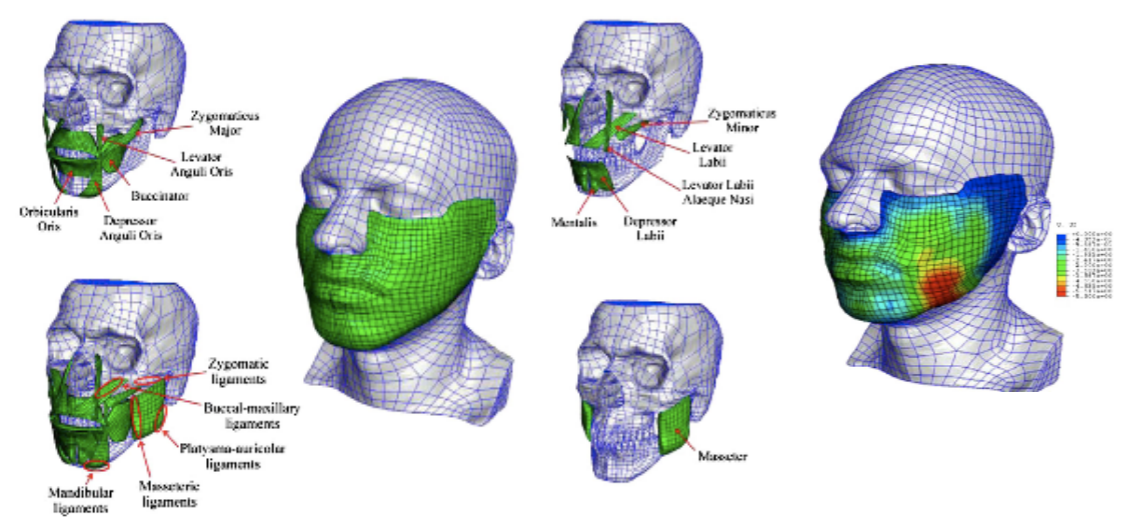
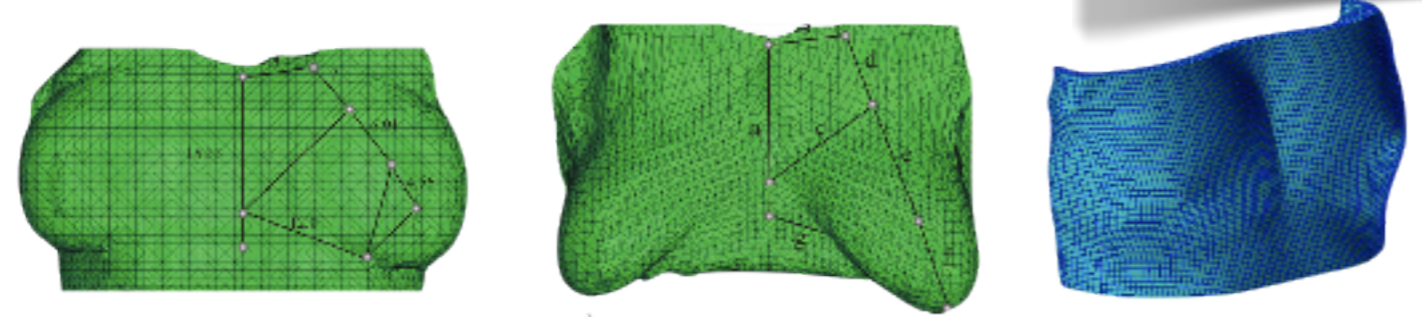
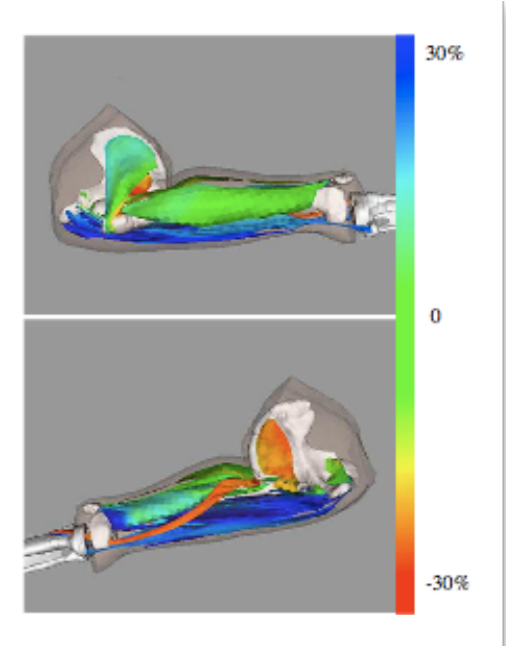
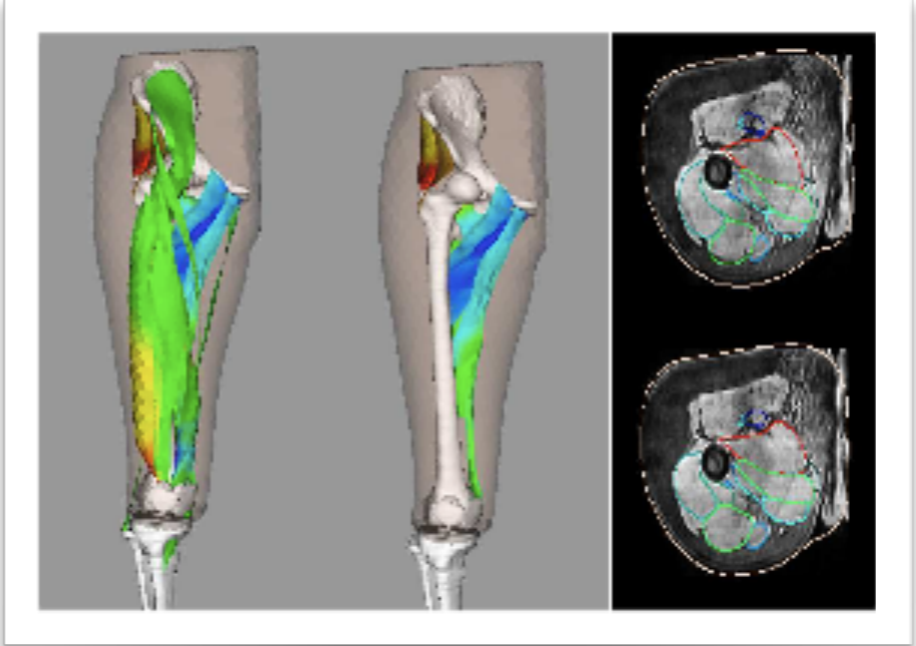
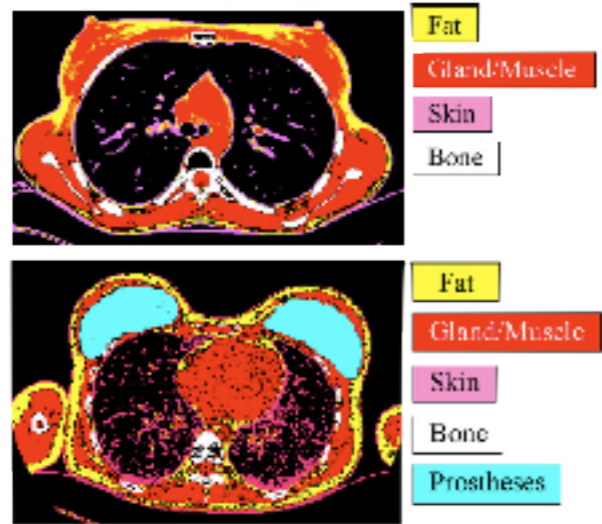


Fabrication de guides chirurgicaux
pour Rhinopoièse



Evaluation de la surface cutanée
expansée disponible

MODELISATION DES TISSUS MOUS



Combiner l'analyse de surface avec des modèles mécaniques validés pour

Evaluer
Simuler
Prévoir

Benjamin Gilles et Nadia Magnenat-Thalmann, « Musculoskeletal MRI segmentation using multi-resolution simplex meshes with medial representations », *Medical Image Analysis* 14, n°. 3 (juin 2010): 291-302.
 A Pérez del Palomar et al., « A finite element model to accurately predict real deformations of the breast », *Medical Engineering & Physics* 30, n°. 9 (novembre 2008): 1089-1097.
 Edoardo Mazza et Giuseppe Giovanni Barbarino, « 3D Mechanical Modeling of Facial Soft Tissue for Surgery Simulation », *Facial Plastic Surgery Clinics of North America* 19, n°. 4 (novembre 2011): 623-637.

Merci de votre attention

56ème Congrès National SoF.CPRE
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(Montpellier, Toulouse)