Crowne Plaza St Peter's Hotel
Rome, Italy
June 9-11 2013

BUILDING ENDOVASCULAR SYNERGIES

MEET 2013
MULTIDISCIPLINARY EUROPEAN ENDOVASCULAR THERAPY
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The Use of Video-motion Analysis to determine the Impact of Anatomical Complexity on Endovascular Performance in Carotid Artery Stenting

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Faculty disclosure

Alex Rolls

I have **no financial relationships** to disclose.

Imperial College London

Introduction
How is Endovascular Skill Presently Assessed?

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Simulator-derived metrics

Quantitative

Procedure and fluoroscopy time[1]

HIGH FIDELITY SIMULATION
Validated,
but *surrogate* markers

Objective structured assessment of technical skills
Modified Global rating scale: generic endovascular skills

Interventionalist code: Procedure: Date:

Please circle the physician's performance on the following scale:

Respect for tissue (stenosis or occlusion)	1 Frequently used unnecessary force on tissue or caused damage by inappropriate use of material	2	3 Careful handing of tissue but occasionally caused inadvertent damage.	4	5 Consistently approached tissues appropriately with minimal damage.
Time and motion	1 Make unnecessary moves.	2	3 Efficient time/motion but some unnecessary moves.	4	5 Clear economy of movement and maximum efficiency.
Knowledge of endovascular material	1 Frequently asked for the wrong tool or used an inappropriate material	2	3 Knew names of most endovascular tools and used appropriate material	4	5 Obviously familiar with endovascular material and their names.
Handling of endovascular material	1 Repeatedly awkward moves and unsure with loss of access, poor stability of the tools and inaccurate positioning of balloon/stent	2	3 Competent use with hardly any loss of access, moderate stability of tools and good positioning of balloon/stent but appeared stiff and awkward occasionally	4	5 Fluid movements with stability of the tools, maintenance of access and perfect positioning of balloon/stent
Flow of intervention	1 Frequently stopped intervention or needed to discuss the next move.	2	3 Demonstrated some forward planning and reasonable progression of procedure.	4	5 Obviously planned course of intervention with efficiency from one move to another
Knowledge of procedure	1 Insufficient knowledge. Looked unsure and hesitant.	2	3 Knew all important steps of the intervention.	4	5 Demonstrated familiarity with all steps of the intervention.
Overall performance	1 Very poor	2	3 Competent	4	5 Clearly superior
Quality of final product	1 Very poor	2	3 Competent	4	5 Clearly superior

Generic & Procedure-specific Rating Scales

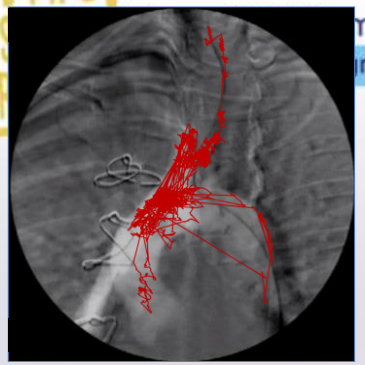
Qualitative

Eg. Knowledge, handling, flow, overall performance[2]

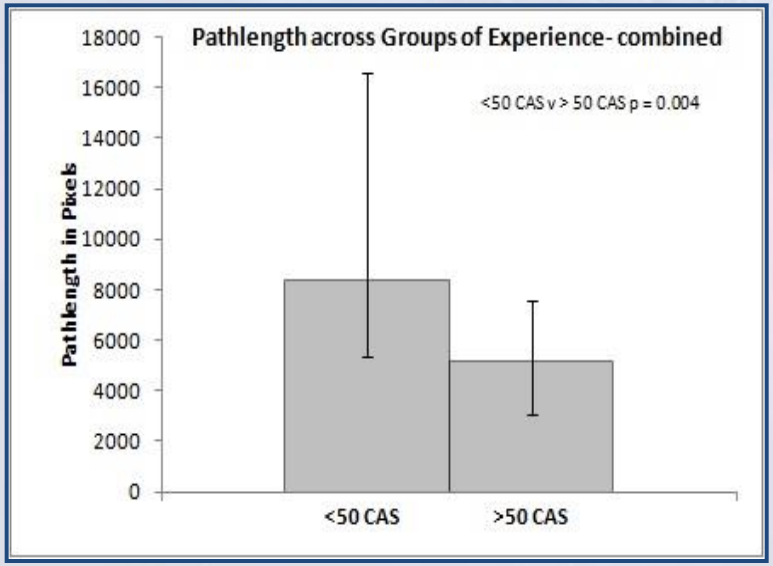
1) *Van Herzeele et al, J Vasc Surg 2007; 46: 855-63*
2) *Van Herzeele et al, EJVES 2008; 35:541-550*

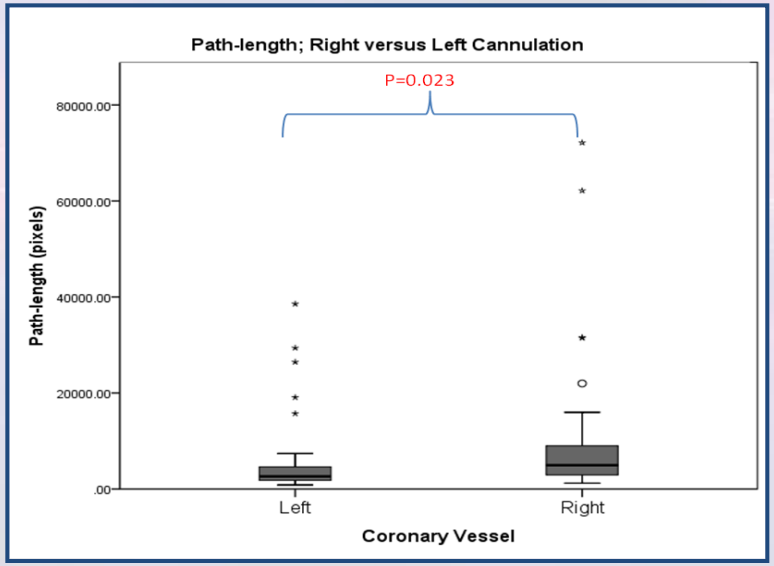
Video-motion Analysis Software

- Video-motion analysis new way of assessing technique and relies on tracking of endovascular tools in fluoroscopic video-sequences to provide data on total catheter-tip movement or path-length (PL)



- VMA is the subject of extensive investigation at our unit; overall objective is to validate as a reliable measure of endovascular skill.





Able to differentiate between levels of experience in simulated CAS
(Rolls et al, EJVES 2013;45(5):509-15)

In a series of 50 coronary angiographies, identified differences between R and L coronaries

Objectives

- To quantify the overall effect of anatomical complexity on efficiency of endovascular performance in a complex procedure.

- To identify anatomical components during Carotid Artery Stenting which present a technical challenge to the operator.

Method

Green Case (<4.9)
Type 1 arch
Symptomatic 90% stenosis LICA

Amber Case (5.0-6.9)
Bovine arch
angled LCCA take-off
Symptomatic (aphasia) 80% stenosis LICA

Red Case (>7.0)
Type 2 arch
Extremely tortuous RCCA.
Symptomatic 80% stenosis RICA

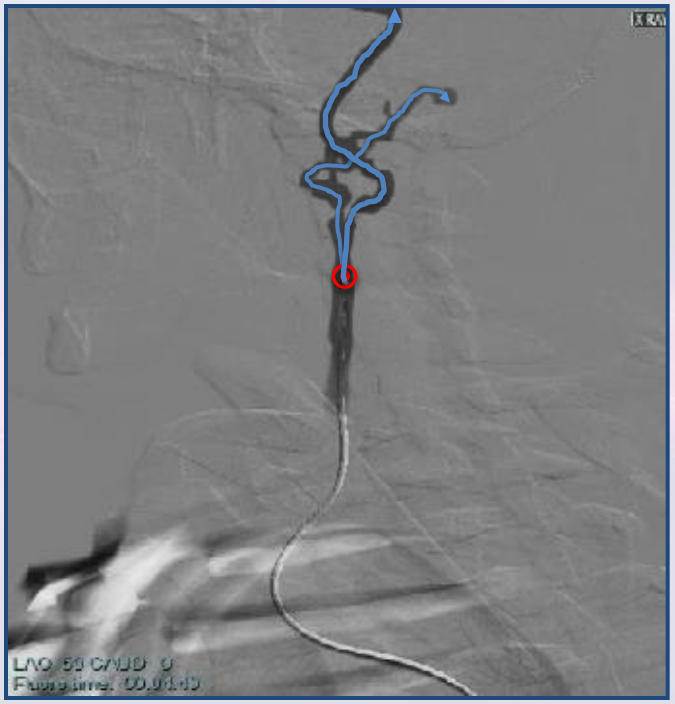
20 novice interventionalists each performed Green, Amber and Red cases in random order. *Willaert et al, JVS 2012; 56(6):1763-70*

Method

60 cases analysed by single observer using VMA software, procedure divided into pre-defined operative stages

Arch navigation: 3rd rib - aortic root

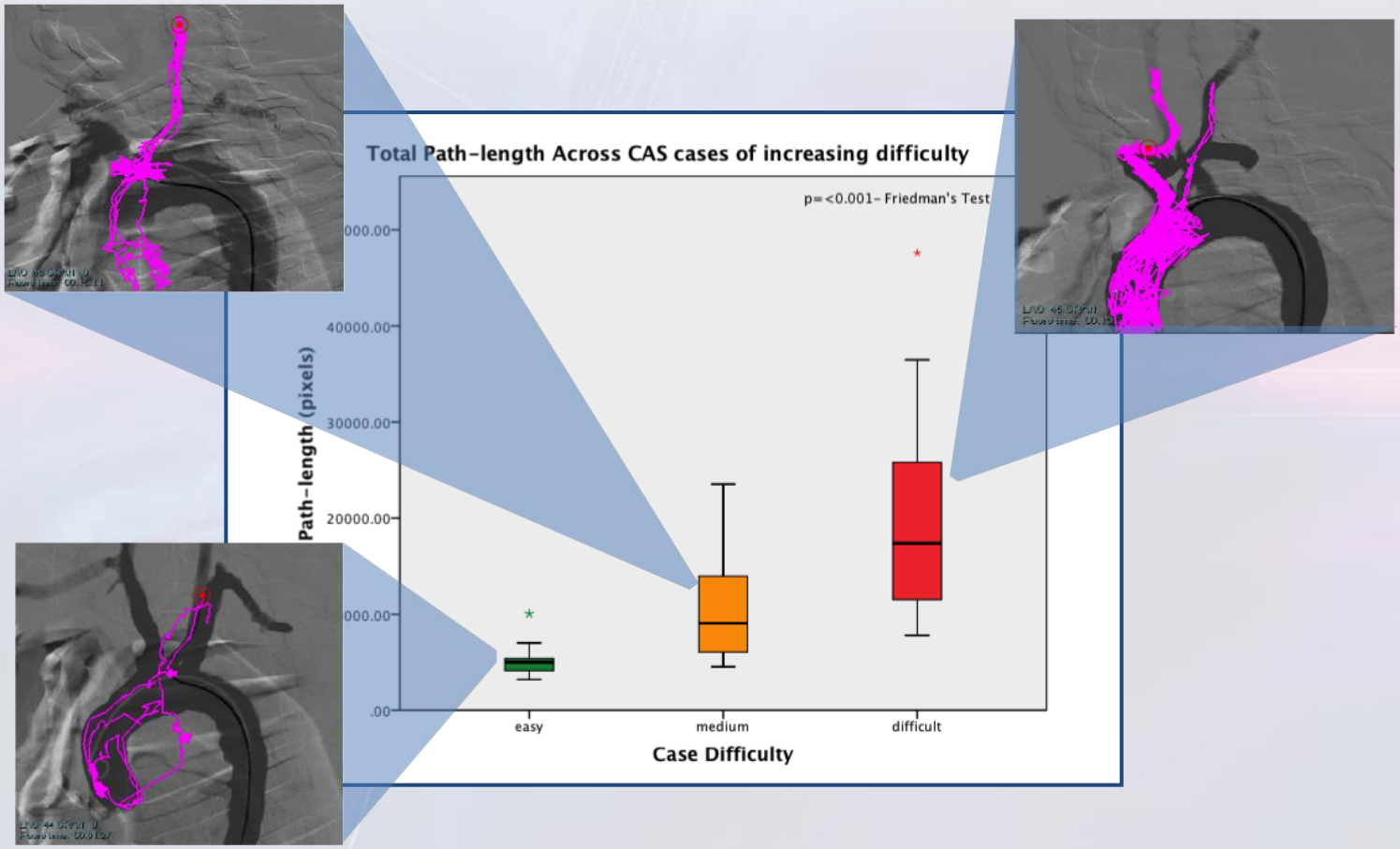
CCA cannulation: aortic root- stable resting position in CCA for further tool deployment



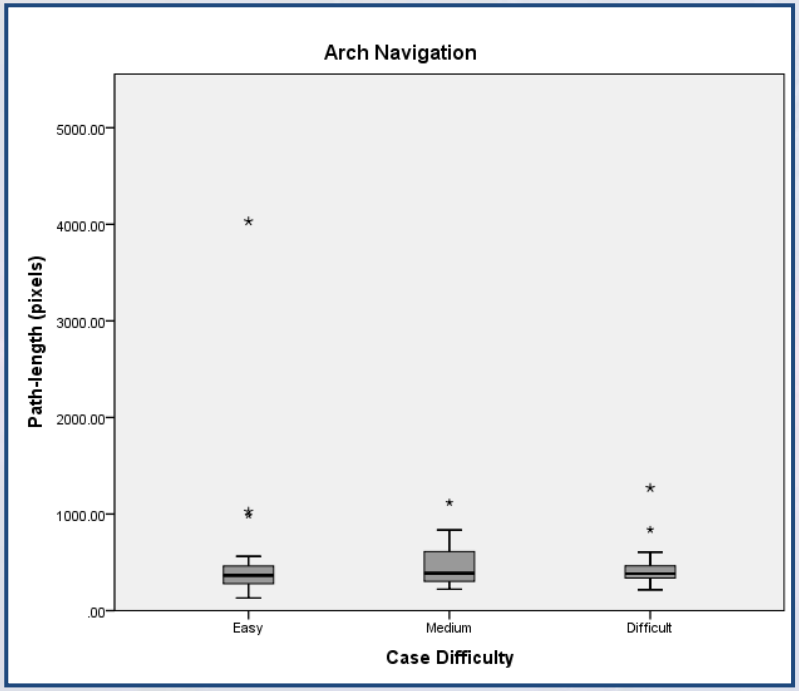
ECA manipulation: stable CCA position- distal tip of ECA

ICA manipulation: stable CCA position- deployment of EPD

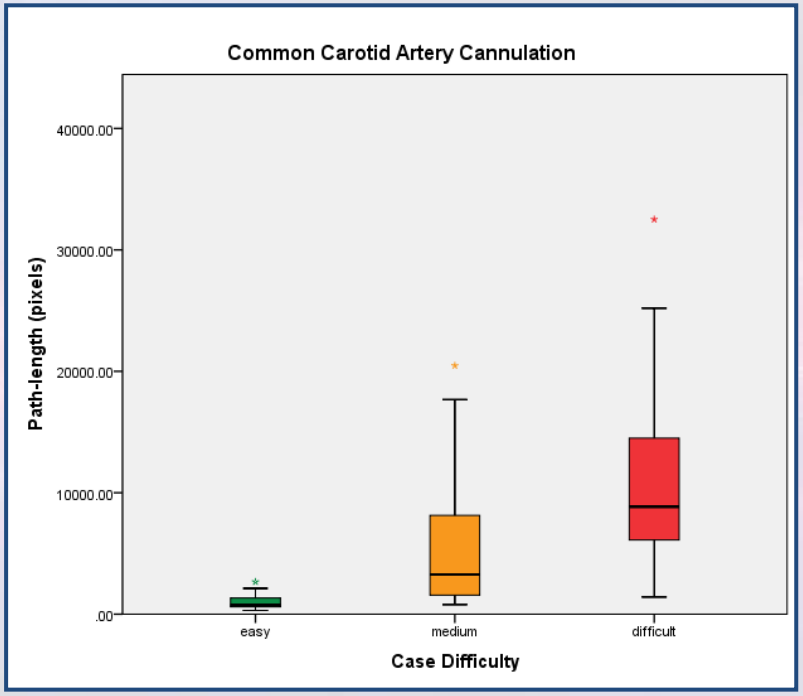
Results



Results

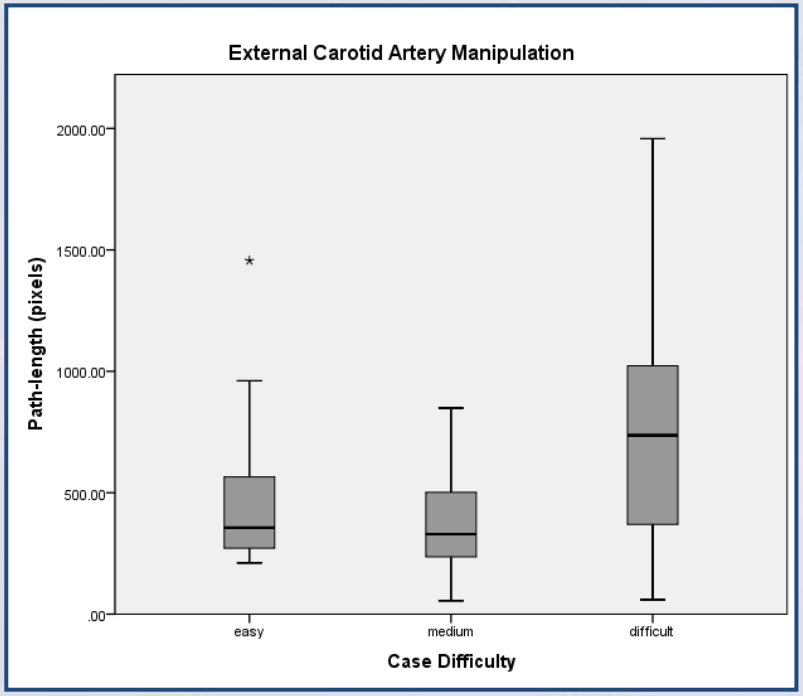


p=0.449- *Friedman's Test*



p=<0.001- *Friedman's Test*

Results



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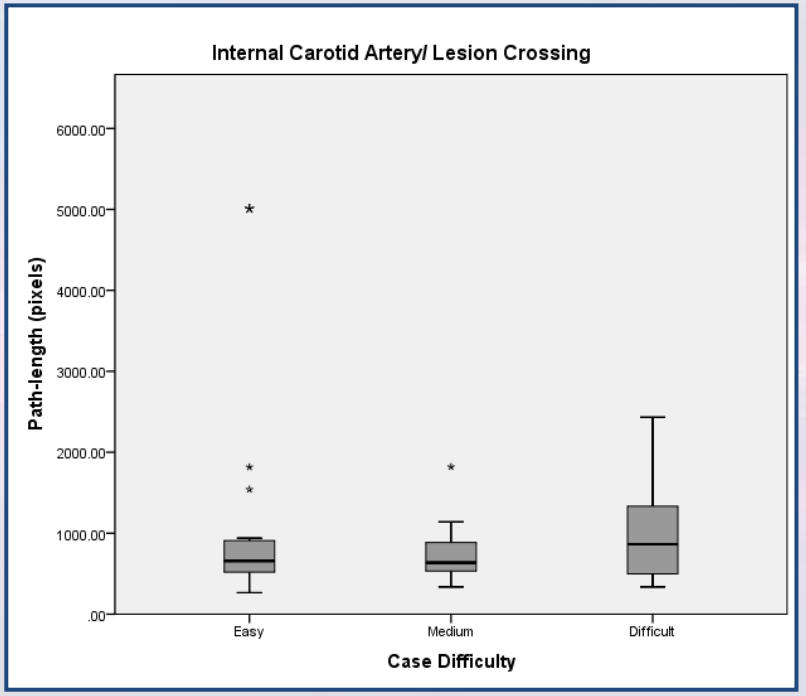

p=0.705- *Friedman's Test*

Conclusions

- Anatomical Variation significantly impacts efficiency of performance measured by VMA data, demonstrating a step-wise deterioration with progressive grades of anatomical difficulty.

- Software able to split the procedure into key components and objectively differentiate challenging from easy procedural phases.

- In CAS, CCA cannulation clearly the discriminating procedural phase which in hard cases leads to excess movement within the arch and may result in increased emboli.

10.4 m of movement