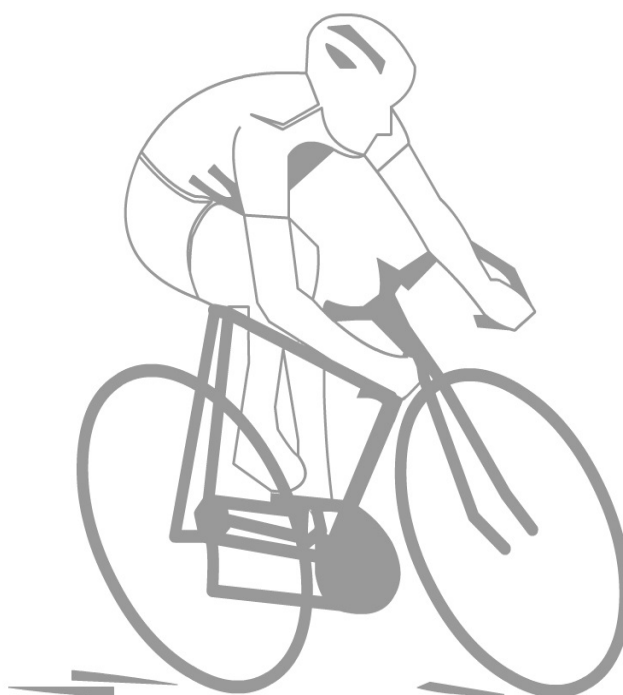# BIKE PROTOCOL

Kinematic analysis and muscle functional evaluation

Patient Details:

SURNAME: RODRIGUEZ SOTELO

NAME: JOSE LUIS

BIRTHDAY: 6/11/1979

SESSION DATE: 21/10/2024

LABORATORIO ANÁLISIS DE MOVIMIENTO

Dynamic Posture on Frontal Plane

ANGLE (°)	FRONTAL INCLINATION
SHOULDERS:	5.2 ± 2.6
PELVIS:	8.9 ± 4.4

value < 0°   LEFT shoulder and LEFT pelvis in UP position

value > 0°   LEFT shoulder and LEFT pelvis in DOWN position

Dynamic Posture on Transversal Plane

ANGLE (°)	TRANSVERSAL ROTATION
SHOULDERS:	-1.5 ± 4.7
PELVIS:	-.5 ± 3.5

value < 0°   LEFT shoulder and LEFT pelvis BACKWARD

value > 0°   LEFT shoulder and LEFT pelvis FORWARD
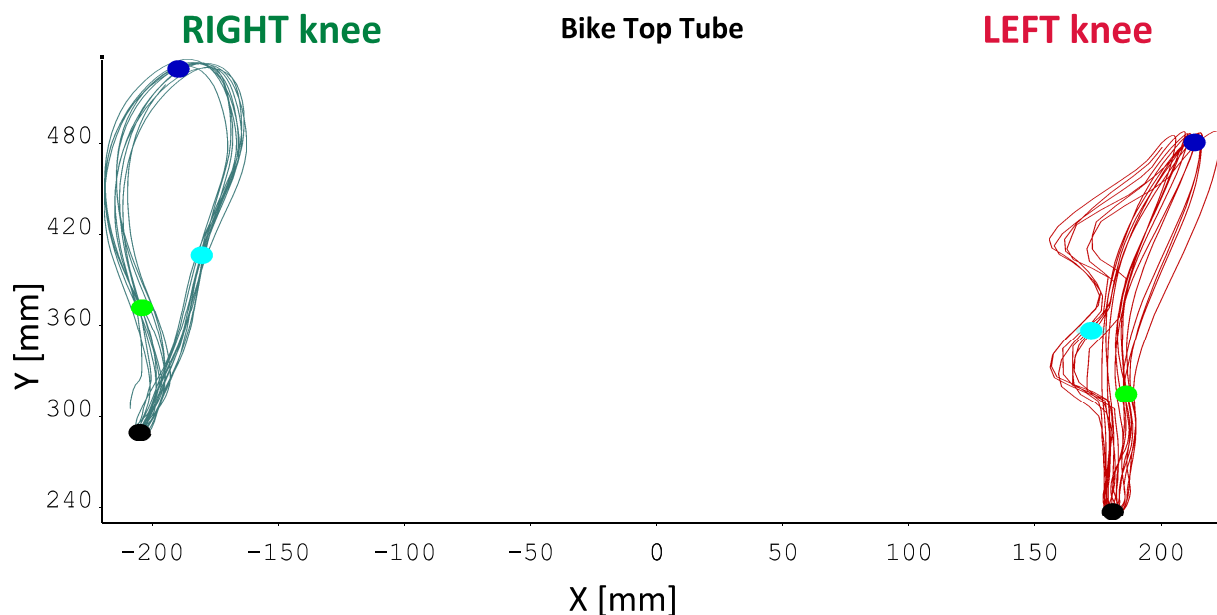
Legend:

Frontal Inclination		Transversal Rotation	
SHOULDERS	PELVIS	SHOULDERS	PELVIS

KNEE Movement on FRONTAL Plane

RIGHT knee   Bike Top Tube   LEFT knee

Knee horizontal distance from the bike top tube

DISPLACEMENT (mm)	RIGHT knee	LEFT knee
POSITION at 0°	-189.6	213.2
POSITION at 90°	-180.4	172.4
POSITION at 180°	-204.9	180.9
POSITION at 270°	-203.9	186.2

Legend:

Frontal plane

KNEE

KINEMATIC ANALYSIS

Dynamic Posture on Sagittal Plane
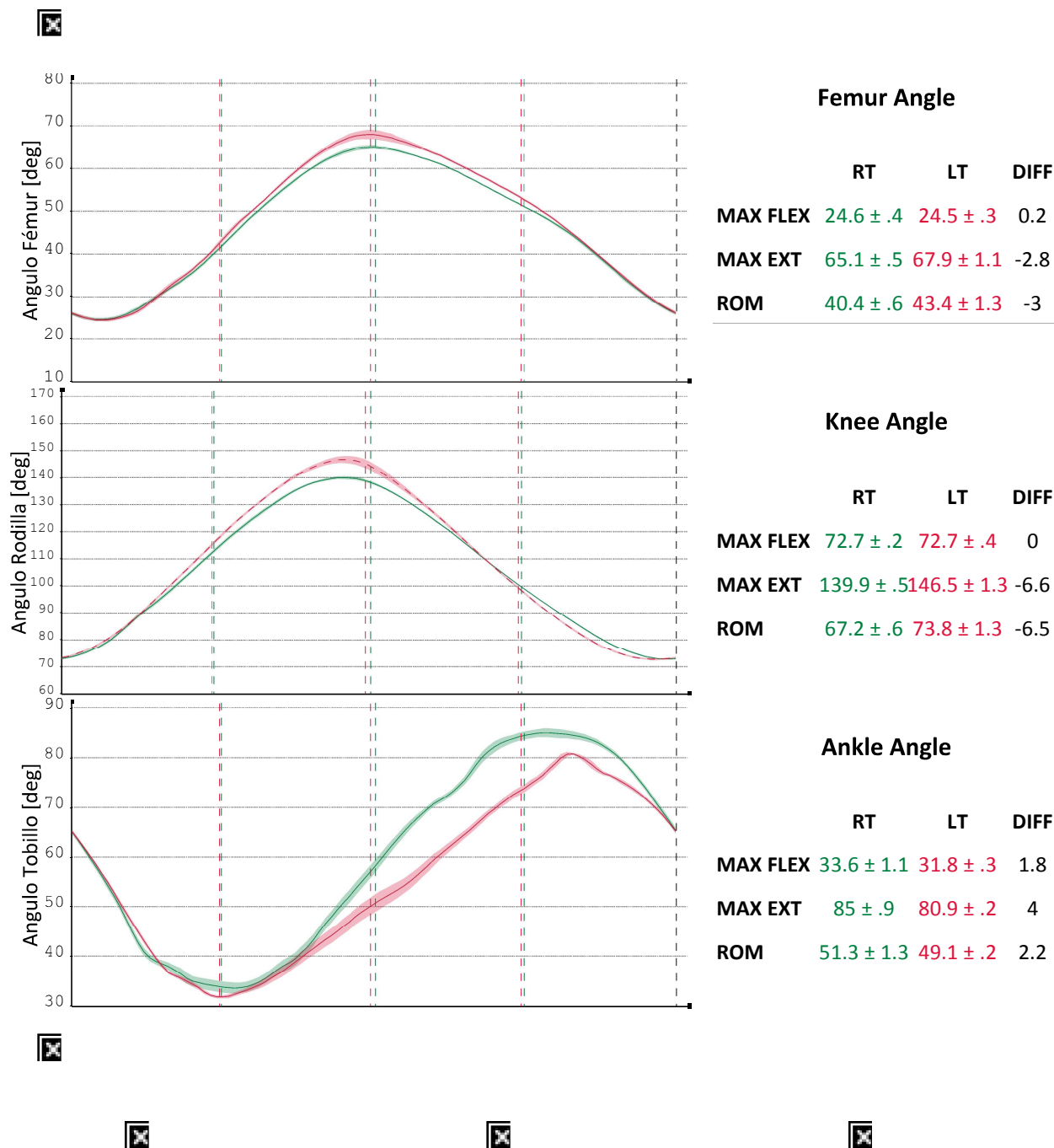
RIGHT SIDE   LEFT SIDE

ANGLE (°)	RIGHT MEAN VALUE	LEFT MEAN VALUE	DIFFERENCE
PELVIS	41.5 ± 2.9	37.6 ± 4.1	3.8
TRUNK	36.7 ± 3	38.3 ± 2.5	-1.6
UNDERARM	78.3 ± 3.9	71.3 ± 3.4	7
ELBOW	110.2 ± 5.8	109.1 ± 5.5	1.2

Legend:

PELVIS	TRUNK	UNDERARM	ELBOW

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LABORATORIO ANÁLISIS DE MOVIMIENTO

RIGHT and LEFT Legs on Sagittal Plane

Femur Angle

	RT	LT	DIFF
MAX FLEX	24.6 ± .4	24.5 ± .3	0.2
MAX EXT	65.1 ± .5	67.9 ± 1.1	-2.8
ROM	40.4 ± .6	43.4 ± 1.3	-3

Knee Angle

	RT	LT	DIFF
MAX FLEX	72.7 ± .2	72.7 ± .4	0
MAX EXT	139.9 ± .5	146.5 ± 1.3	-6.6
ROM	67.2 ± .6	73.8 ± 1.3	-6.5

Ankle Angle

	RT	LT	DIFF
MAX FLEX	33.6 ± 1.1	31.8 ± .3	1.8
MAX EXT	85 ± .9	80.9 ± .2	4
ROM	51.3 ± 1.3	49.1 ± .2	2.2

FEMUR   KNEE   ANKLE

KINEMATIC ANALYSIS

Maximum Pushing Phase

(when the feet are aligned horizontally)

RIGHT SIDE   **LEFT SIDE**

ANGLE (°)	RIGHT MEAN VALUE	LEFT MEAN VALUE	DIFFERENCE
KNEE MOVING BACK	-3.3 ± .3	-1.2 ± .2	-2.2
KNEE (POPLITEAL)	112.9 ± .6	114.6 ± .7	-1.7
ANKLE	33.8 ± 1.1	31.9 ± .3	2
PUSHING ANGLE	70 ± .3	69 ± .3	1

RPM = 62

Legend:

KNEE MOVING BACK   KNEE (POPLITEAL)   ANKLE   PUSHING ANGLE
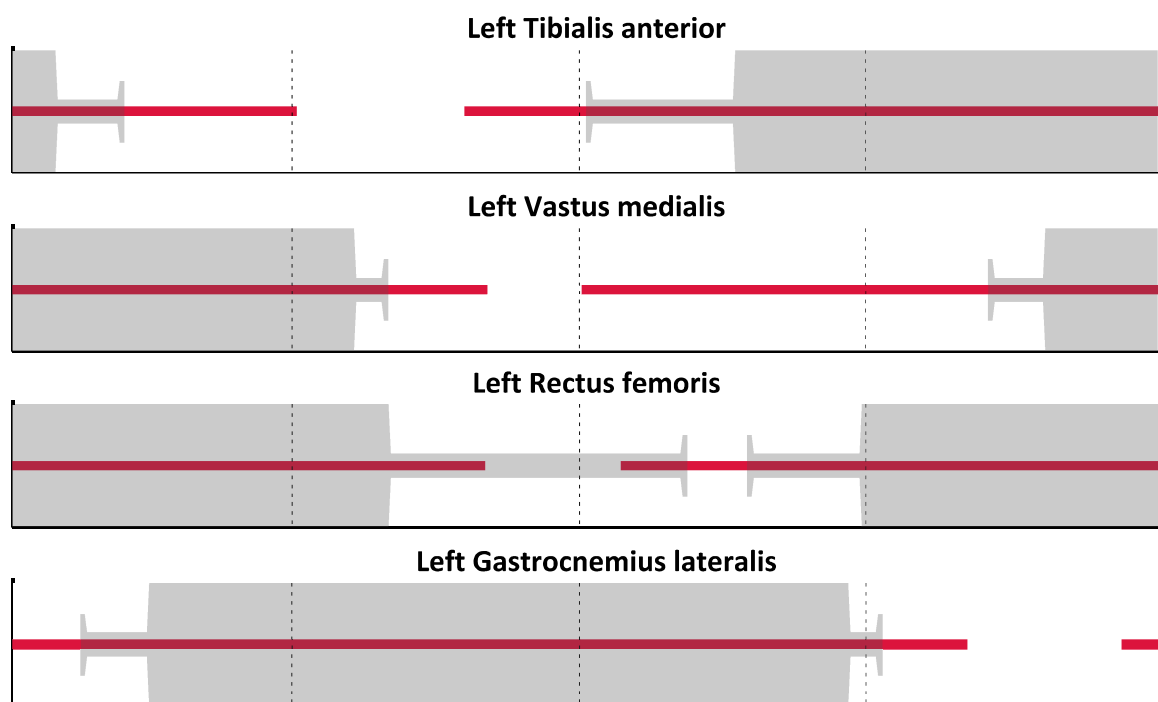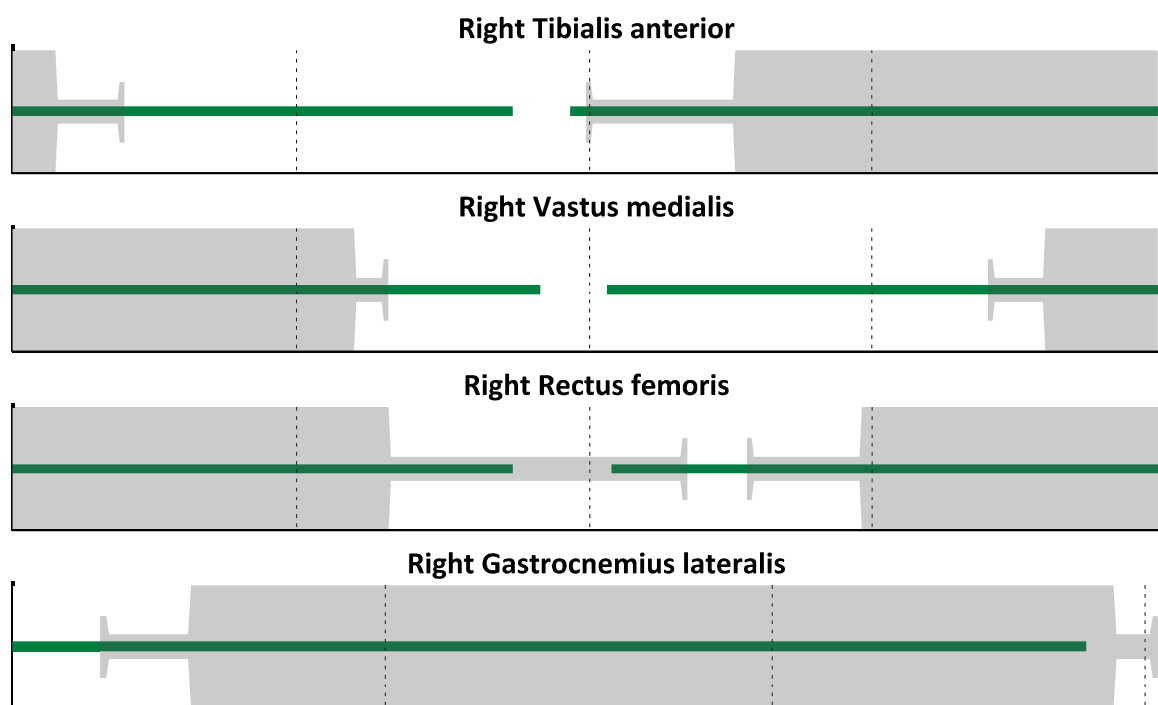
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Muscle Coordination

Right Tibialis anterior

Right Vastus medialis

Right Rectus femoris

Right Gastrocnemius lateralis

Left Tibialis anterior

Left Vastus medialis

Left Rectus femoris

Left Gastrocnemius lateralis

Amplitude Analysis: normalization on Peak

Right Tibialis anterior

muscle contribution:

13 %

Right Vastus medialis

muscle contribution:

10 %

Right Rectus femoris

muscle contribution:

10 %

Right Gastrocnemius lateralis
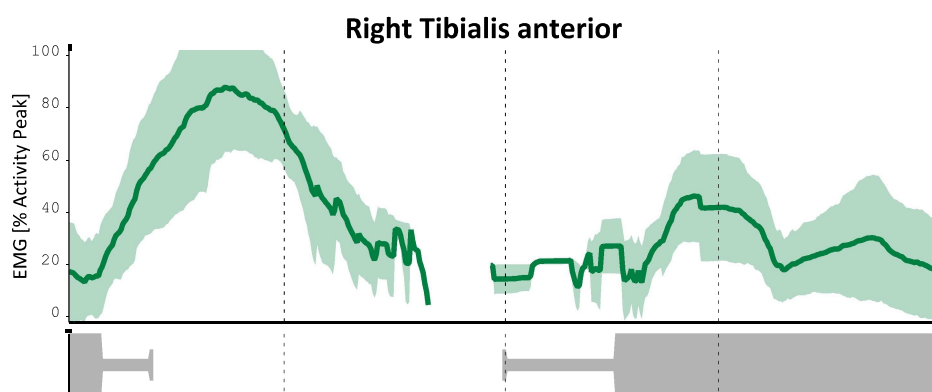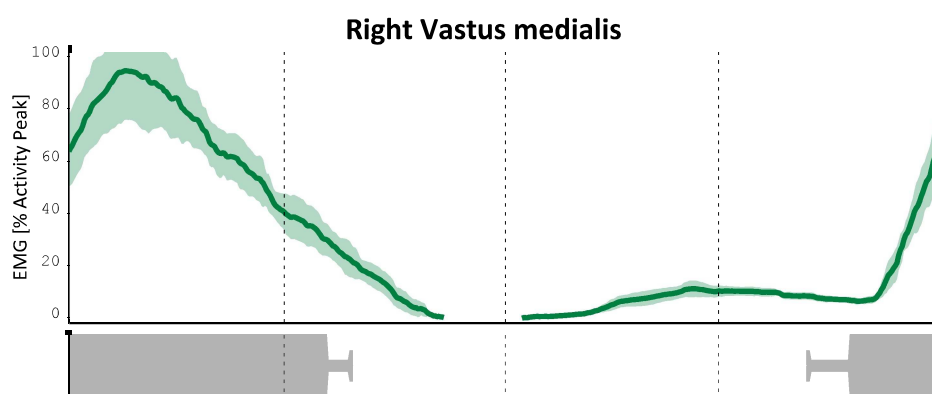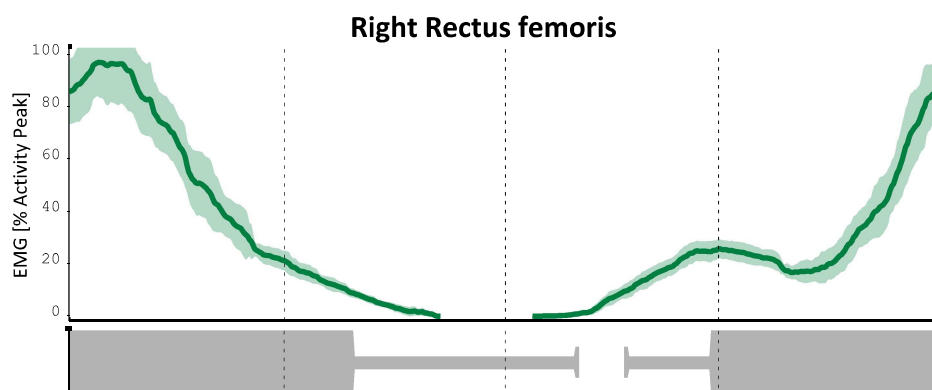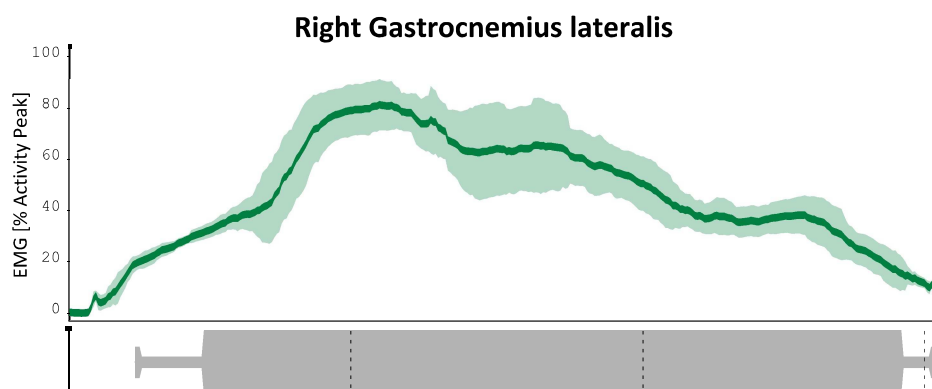
muscle contribution:

16 %

Total of Right side:

49 **%**

LABORATORIO ANÁLISIS DE MOVIMIENTO

Amplitude Analysis: normalization on Peak

Left Tibialis anterior

muscle contribution:

18 %

Left Vastus medialis

muscle contribution:

9 %

Left Rectus femoris

muscle contribution:

12 %

Left Gastrocnemius lateralis

muscle contribution:

11 %

Total of Left side:

51 %
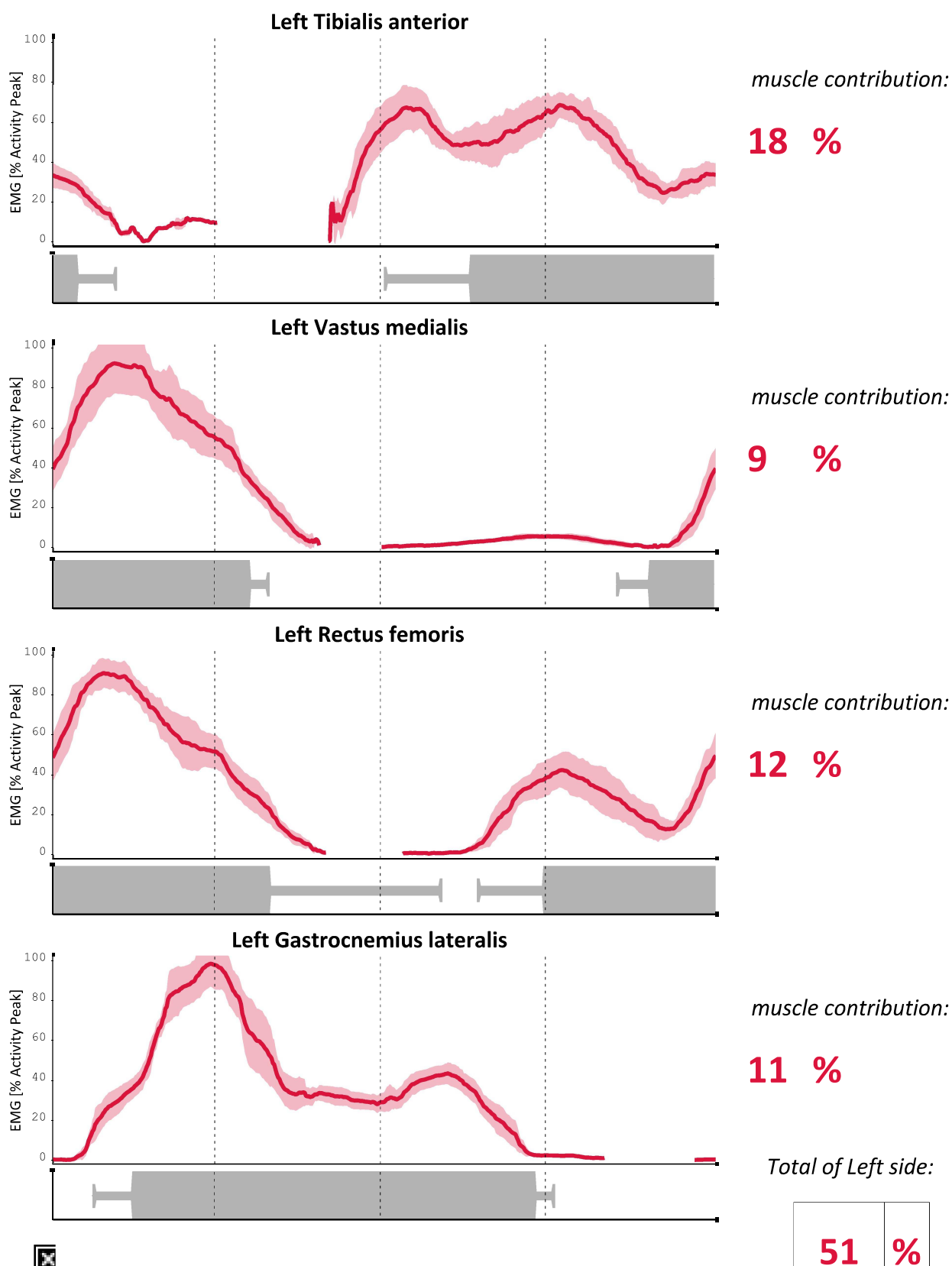
VIDEO ANALYSIS

RIGHT View

LEFT View