MULTICENTER OSTEOARTHRITIS STUDY

READING CENTER DATASET DESCRIPTION

V3SEMG

MAY 2022

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1. Dataset description and Analyst Notes

Dataset: V3SEMG.sas7bdat
Observations: 2156 records (1871 participants; 1 or 2 records per participant: Left and/or Right)
Documentation:

- VariableGuide_V3SEMG.pdf
- Distributions_V3SEMG.pdf
- Operation manual chapter: 3P_IsokineticStrengthAndMuscleActivation_v1.0pSept2021.pdf

V3SEMG dataset contains 2156 records; one or two records per participant. SEMG data collected during 60m clinic visit for all eligible participants who did not meet exam exclusion criteria. In addition, if sEMG data file was unreadable and therefore all parameters were blank, record was not included in the final Reading Center dataset.

According to the protocol, only selected participants with non-recent KR (N=338) were eligible to get the test bilaterally, majority of participants completed unilateral test (right leg preferred).

Isokinetic exam was a requirement to complete sEMG, but not everyone who completed isokinetic exam had sEMB. Some participants met additional exclusion criteria (open wound on the leg) or refused sEMG test.

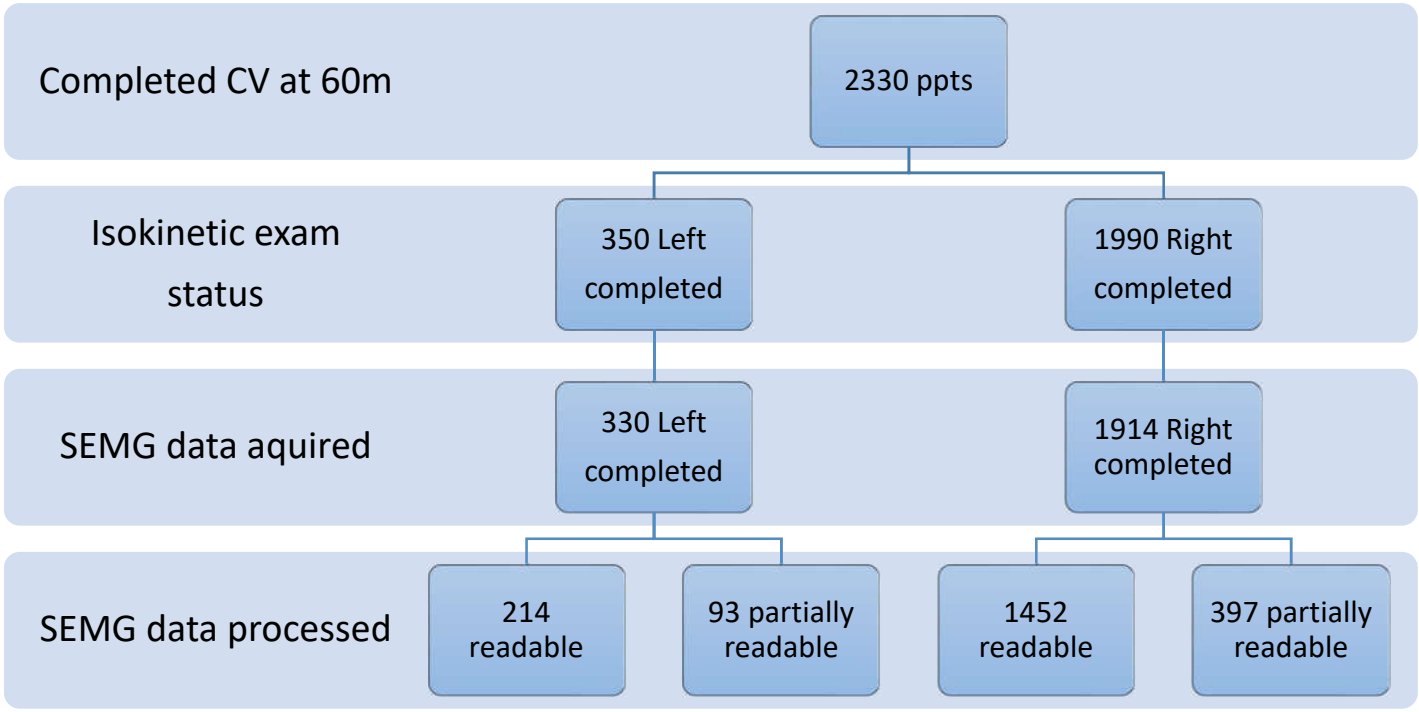
Dataset structure:

- Variables #1 to #6 from the MOST tracking forms, including V3SEMG_STATUS:
  1=Readable – all parameters obtained;
  2=Partially readable – only partial set of parameters are valid
  See variables V3TESTL/R and V3EMGL/R from dataset V3ENROLL for additional tracking indicators if exam was performed and Annotated forms for exclusions.

- Variables #7 to #104 – reading parameters, derived variables and summary reading parameters

sEMG data was processed by two analysts at UCSF trained by Dr. L. Frey Law to import the raw data and produce sEMG parameters.

2. FLOW CHART – SEMG exam completion and reading status



Summary report: reason exam was not completed, exclusion criteria:

	N participants	%
Clinic visit 60M done	**2330**	**100%**
Isokinetic exam done (unilateral or bilateral)	2002	85.9%
sEMG exam done (unilateral or bilateral)	1927	82.7%
sEMG data processed (unilateral or bilateral)	1871	80.3%
sEMG exam not done	**403**	**100%**
Isokinetic test exclusion criteria met*	83	20.6%
Isokinetic test done - sEMG not done (additional exclusion** or participant declined to use sensors)	75	18.6%
Exclusion criteria not met - participant refused to complete exam	111	27.5%
Exclusion criteria not collected - participant declined exam	40	9.9%
Equipment problem	94	23.3%

*exclusion criteria includes: unrepaired hernia, pacemaker or other implantable device; brain aneurism or cerebral hemorrhage; knee or hip surgery in the past 3 months; cataract surgery in the last 6 weeks; high blood pressure; heart attack in the last 6 weeks.

**Additional exclusion for sEMG test (but not for isokinetic exam): silver or adhesive sensitivity; skin irritation or wound.

3. References

- **Segal**, et al., OARSI 2010, “Co-Activation of the Hamstrings During Isokinetic Quadriceps Activation Does Not Differ By History of Knee Joint Buckling”

- **Segal**, et al., OARSI 2010,“Isokinetic quadriceps strength measurements differ by hamstring co-activation level in the Multicenter Osteoarthritis Study.”

- **Neogi**, et al., OARSI 2011, “The association of peripheral and central sensitization with muscle coactivation: A common mechanism affecting pain and function in knee OA? ” (note won new investigator award)

4. Reading protocol

Figure 1. Screenshot of data file

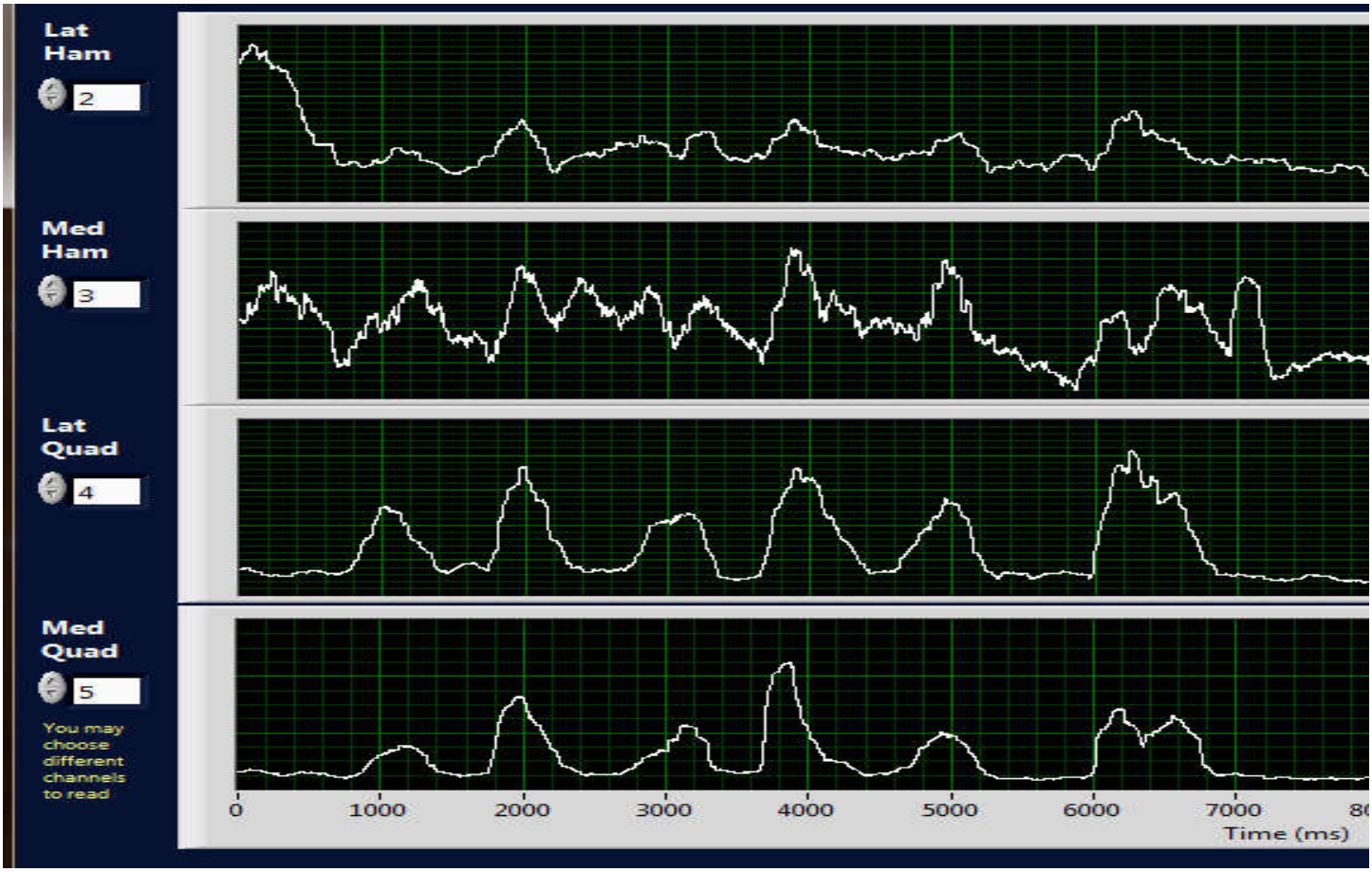


Figure 2. sEMG variables

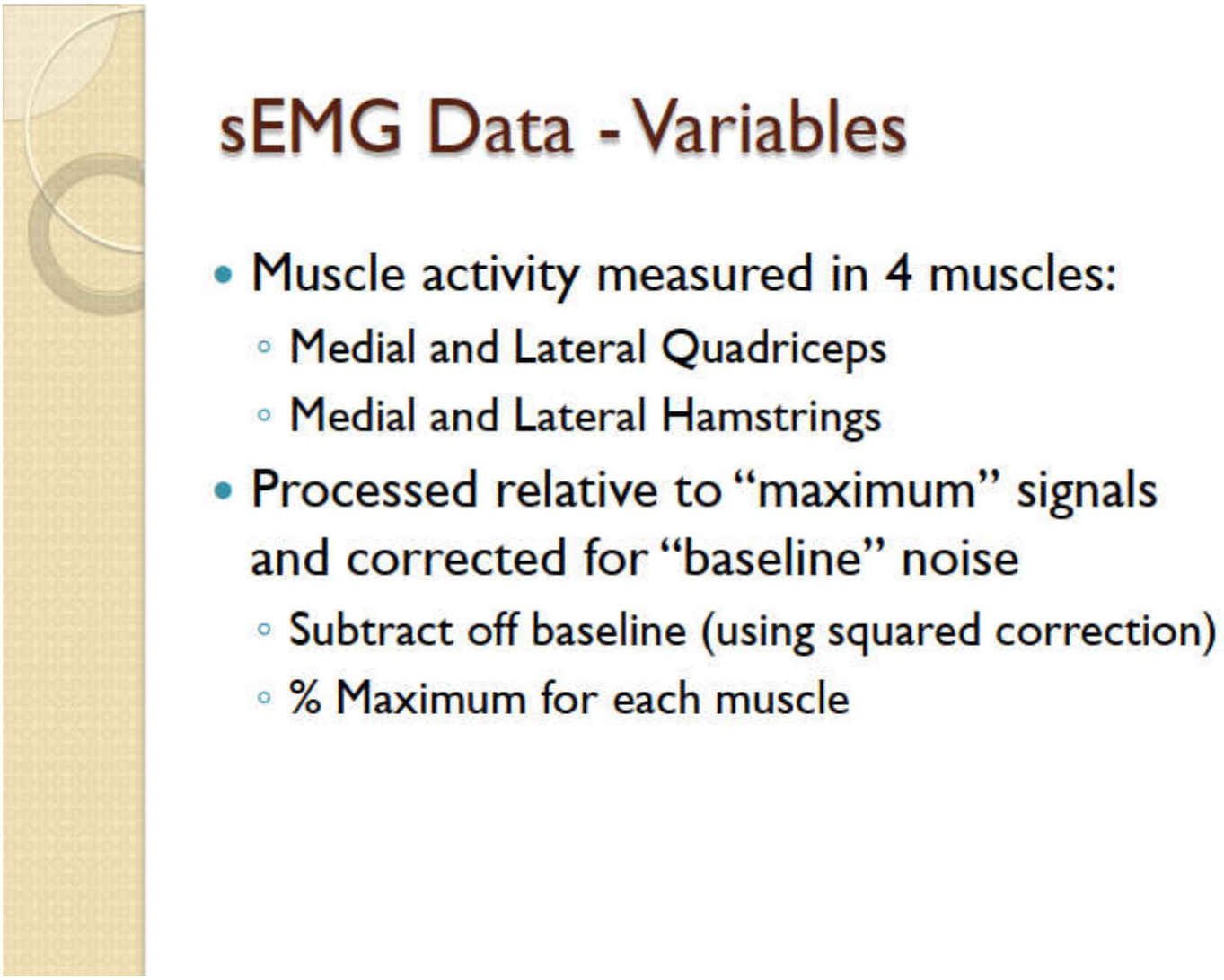


Figure 3 – signal to noise ratio

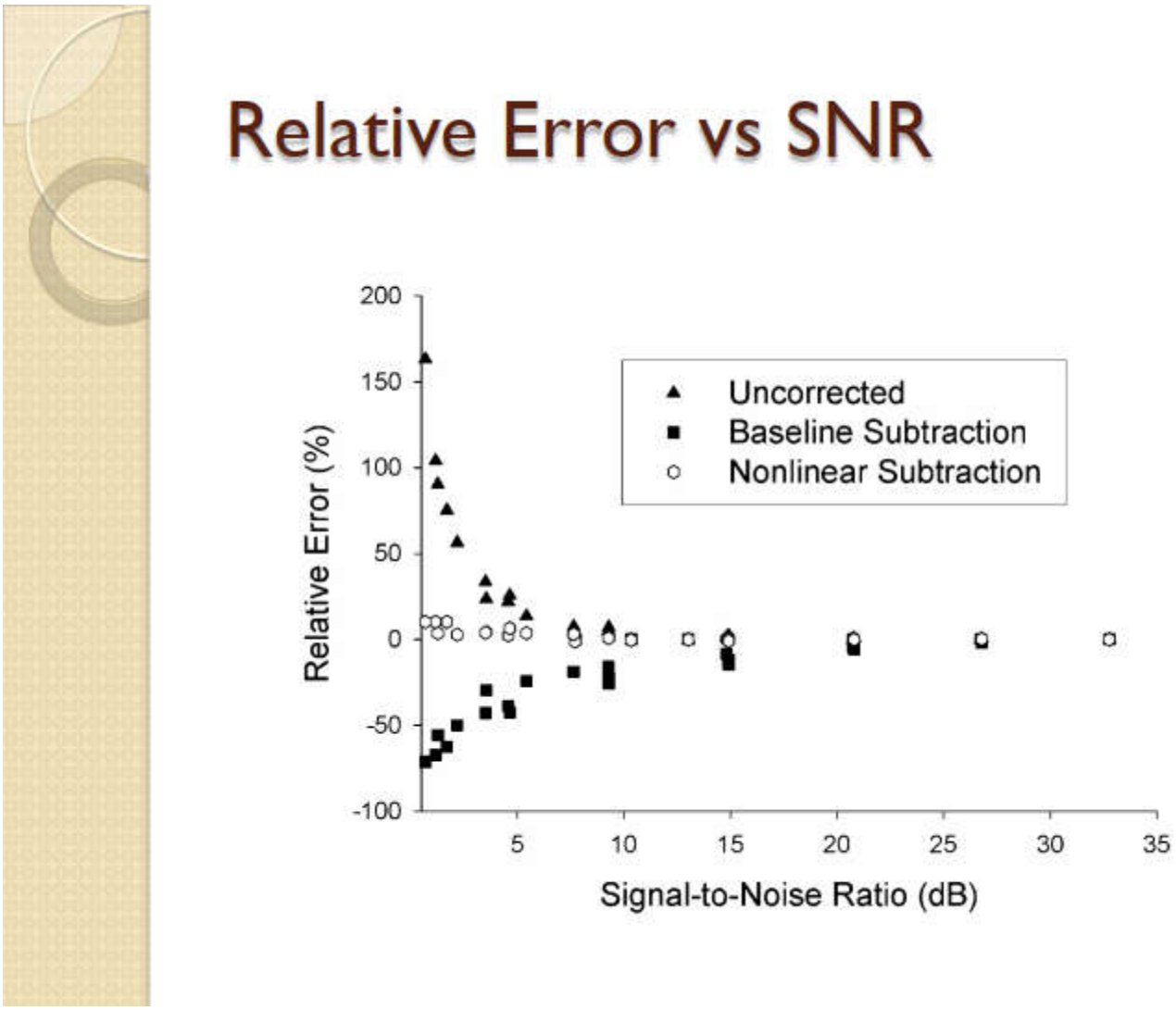


Figure 4 – signal readability status

Data Status – Site by Sex

- **Readability** ("1" – clear, valid signals; "2" – reasonable clarity; "0" – unreadable/ unusable)

Muscle	UAB 1	UAB 2	UAB 0	UI 1	UI 2	UI 0	1+2 Total
Lat Hamstring - Females	61.3%	23.2%	15.3%	70.0%	16.3%	12.9%	88.3%
Lat Hamstring - Males	78.4%	15.2%	6.4%	82.8%	9.2%	7.2%	
Med Hamstring - Females	61.8%	24.4%	13.7%	78.5%	12.3%	8.5%	89.8%
Med Hamstring - Males	78.4%	13.8%	7.9%	80.6%	10.0%	8.5%	
Lat Quadriceps - Females	66.4%	22.1%	11.4%	59.8%	21.0%	18.4%	87.8%
Lat Quadriceps - Males	86.7%	9.8%	3.4%	82.6%	8.1%	8.5%	
Med Quadriceps - Females	68.7%	22.1%	9.1%	60.9%	21.4%	16.9%	88.9%
Med Quadriceps - Males	86.2%	8.4%	5.4%	81.3%	11.3%	6.5%	
Range (%)	**61 - 87**	**8 – 24**	**3 – 15**	**60 – 83**	**8 – 21**	**7 - 18**	

Data Status – Total "1's" by Sex

- Readability :"1" – clear, valid signals only

Muscle	Females	Males
Lat Hamstring	909 (56.5%)	699 (43.5%)
Med Hamstring	977 (58.6%)	689 (41.4%)
Lat Quadriceps	862 (54.1%)	732 (45.9%)
Med Quadriceps	884 (55.0%)	724 (45.0%)

5. Appendix.

Table A. Comparison between participants with and without sEMG data

60m clinic visit completed	sEMG exam not done or data unreadable		sEMG exam done and data available (at least partially)		Total
	N	Row %	N	Row %	
Total	459	19.6%	1,871	80.3%	2,330
UAB	276	24.3%	857	75.6%	1,133
UIowa	183	15.2%	1,014	84.7%	1,197
Sex/Gender					
Female	282	20.0%	1,127	79.9%	1,409
Male	177	19.2%	744	80.7%	921
Age (mean (SD))	63.4(8.3)		61.8(7.7)		62.1 (7.8)
Age at BL, 3 categories					
Age 50-59	154	16.6%	771	83.3%	925
Age 60-69	187	19.8%	754	80.1%	941
Age 70-79	118	25.4%	346	74.5%	464
Race					
White or Caucasian	359	18.2%	1,604	81.7%	1,963
Af-Am or other non-white	100	27.2%	267	72.7%	367
BMI at clinic visit (mean(SD))	31.9 (7.3)		30.7 (5.8)		30.9 (6.1)
Body mass index, 3 Categories					
.M:Missing	2	100.0%	0	0	2
Under 25	64	18.7%	277	81.2%	341
25 to under 30	154	18.5%	678	81.4%	832
30 or more	239	20.6%	916	79.3%	1,155