

Humanetics Innovative Solutions, Inc.



John Below

Feb 7, 2011

BioRID Update

- ▶ S1 Load Investigation During Head Restraint Tests
- ▶ Deceleration ETD Covering
- ▶ Cervical Pin Test Investigation
 - Normal vs Tight Cervical Pin
 - ▶ Dummy Certification with out Head Restraint
 - ▶ Dummy Certification with Head Restraint
 - Non Rusty vs Rusty Cervical Pin Test
 - ▶ Dummy Certification with out Head Restraint
 - ▶ Dummy Certification with Head Restraint

BioRID Update

- ▶ Probe Holder
- ▶ Head Rest Setup Scale Zeroing Tool
- ▶ Certification Manual Updates
- ▶ User Manual Updates
- ▶ Jacket Testing - No Update
- ▶ Future Plans

BioRID Effects on Certification Test Summary

Affect	Certification Tests	Headrest Cert Test	Sled Testing	Action Taken	Comments
Jacket Stiffness	Yes	Yes	Yes	Tighten Manufacturing Specs Dynamic stiffness test in development	Draft Stiffness Spec Due Sept 17
Water amount in Jacket	No	No, Minor affect to rebound	?	Add Weight spec for water install in jacket	
Head MMI	No	Minor Affect	?	TBD	
Damper Oil amount	No	No	No	None	
Pelvis Stiffness	No	No	Concern about seating height	TBD for MFG	Group did not want test for Cert
Lateral tilt adjustment of OC Plate	Yes	Yes	Yes	Revised Adjustment procedure under development Add Upper My to Cert Test	
Spine Set up	TBD	TBD	TBD		Due Feb 24
Bumper Stiffness	TBD	TBD	TBD		Due April 1
Vertebra Fit	TBD	TBD	TBD		TBD
Muscle Spring Stiffness	TBD	TBD	TBD		TBD

BioRID Effects on Certification Test Summary

Affect	Certification Tests	Headrest Cert Test	Sled Testing	Action Taken	Comments
Cervical Pin Fit (Normal vs Tight)	Significant Differences	Small Differences			
Cervical Pin Fit (Normal vs Rusty)	No	No			
Cervical Pint Fit (Normal vs Loose)	TBD	TBD			Due Feb 24

S1 Load Investigation During Head Restraint Tests

- ▶ Investigated the lumbar loads during engagement with dummy stop
- ▶ Recorded data during catcher impact
 - Large forces and moments seen during impact with catcher.
- ▶ Update dummy catcher to better control dummy loading

Head Restraint Test Dummy Catcher Loads

- ▶ Redesigned the shape to reduce loading at S1



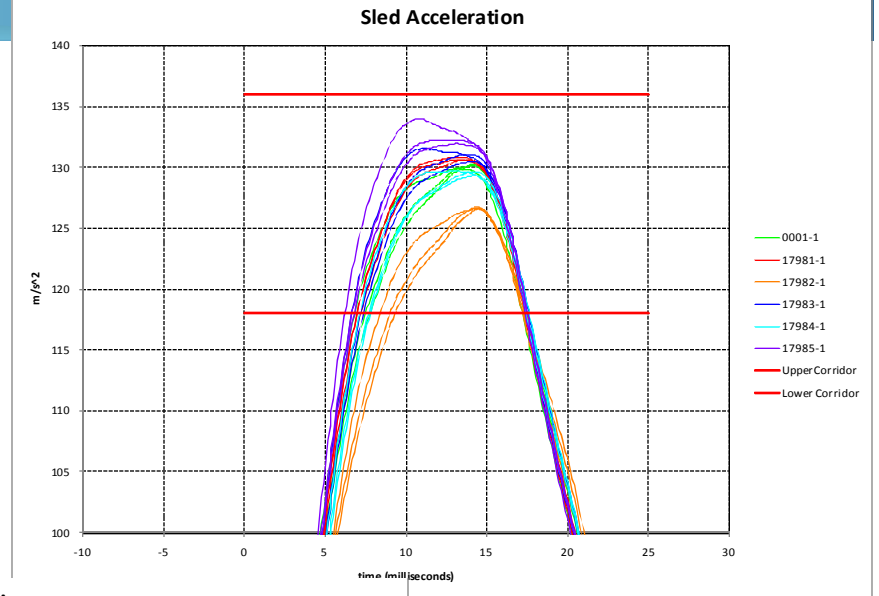
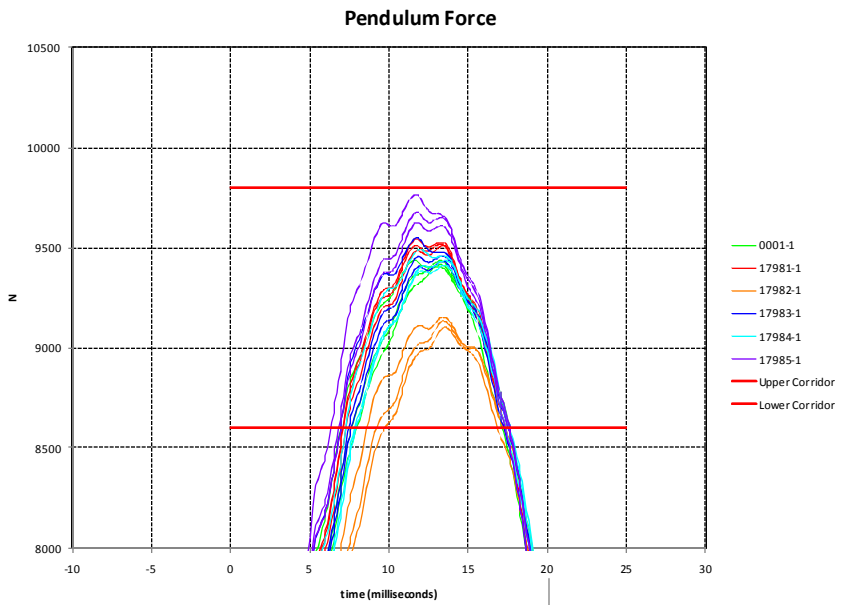
Deceleration ETD Covering

- ▶ Latex covered
 - Humidity Sealed
- ▶ Good test results
- ▶ Working on Head Restraint ETD

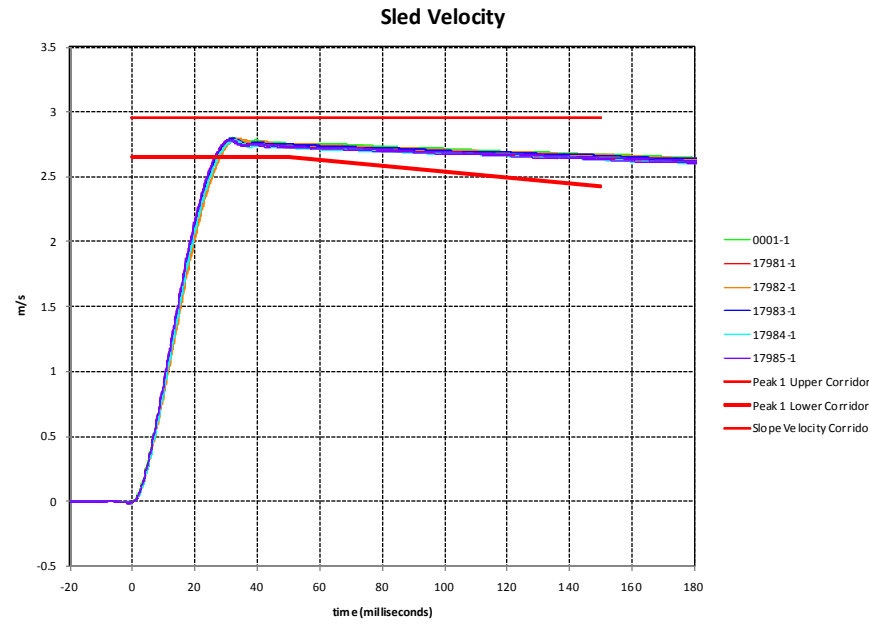
- ▶ Will be ready to ship next week



Deceleration ETD Covering



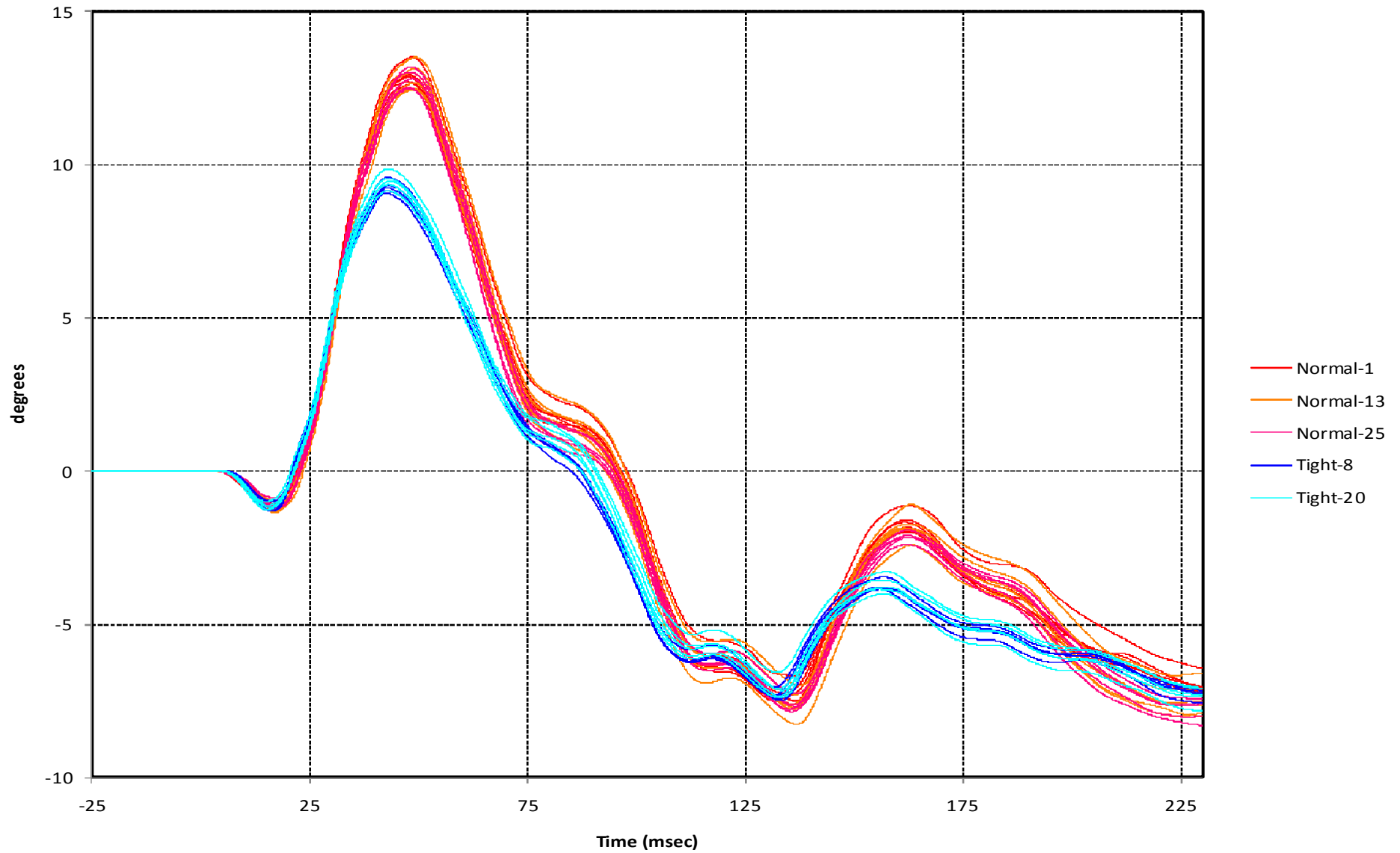
ETD Test
Performance within
Acceptable limits



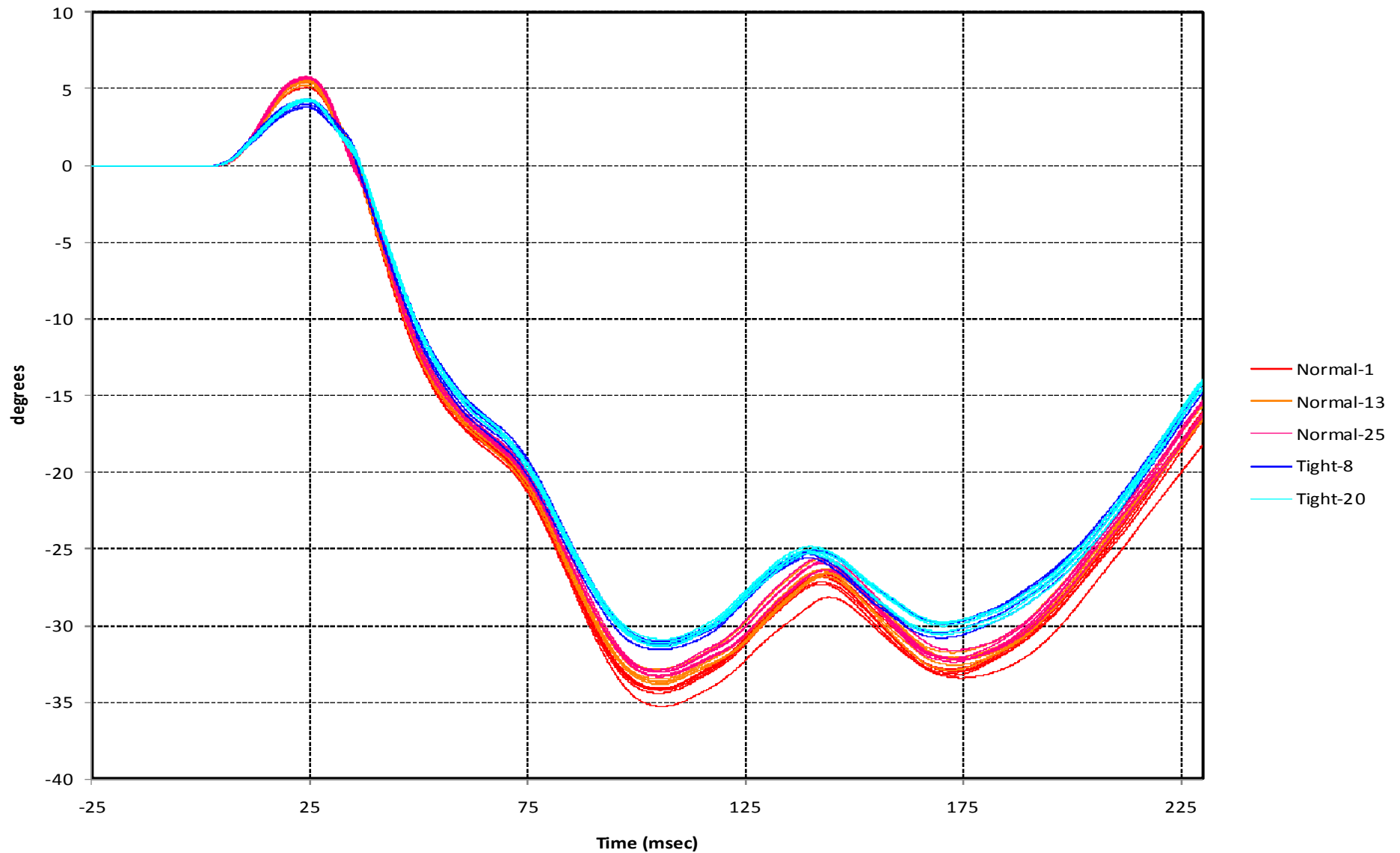
BioRID Cervical Pin Test Series

- ▶ Normal vs Tight Cervical Pins
- ▶ Dummy Certification without Head Restraint
- ▶ Tight pins were selected as being 0.018 mm larger than the normal pin to ensure a interference fit.
- ▶ Significant Differences in Dummy Performance

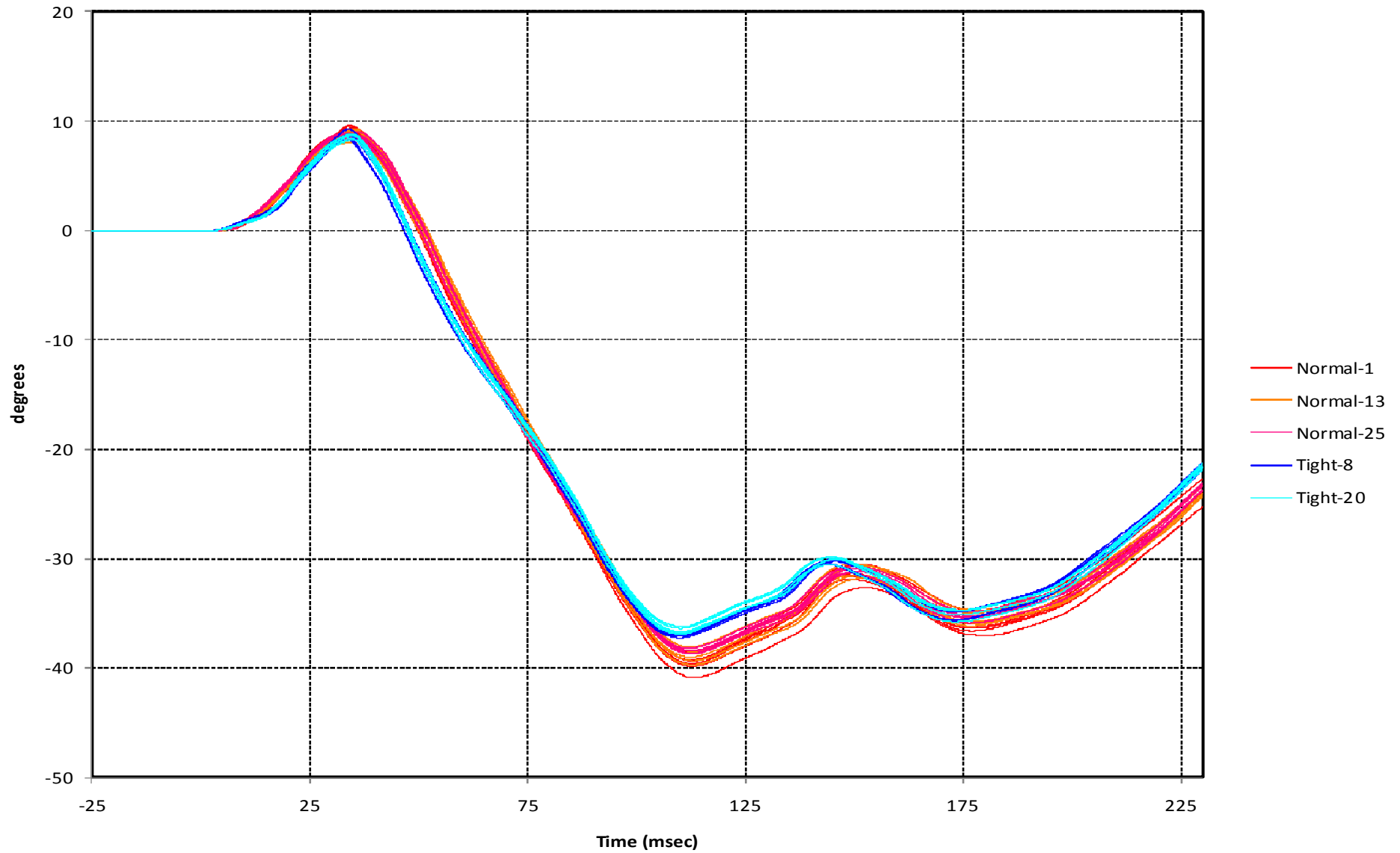
Pot A - Head Rotation about OC



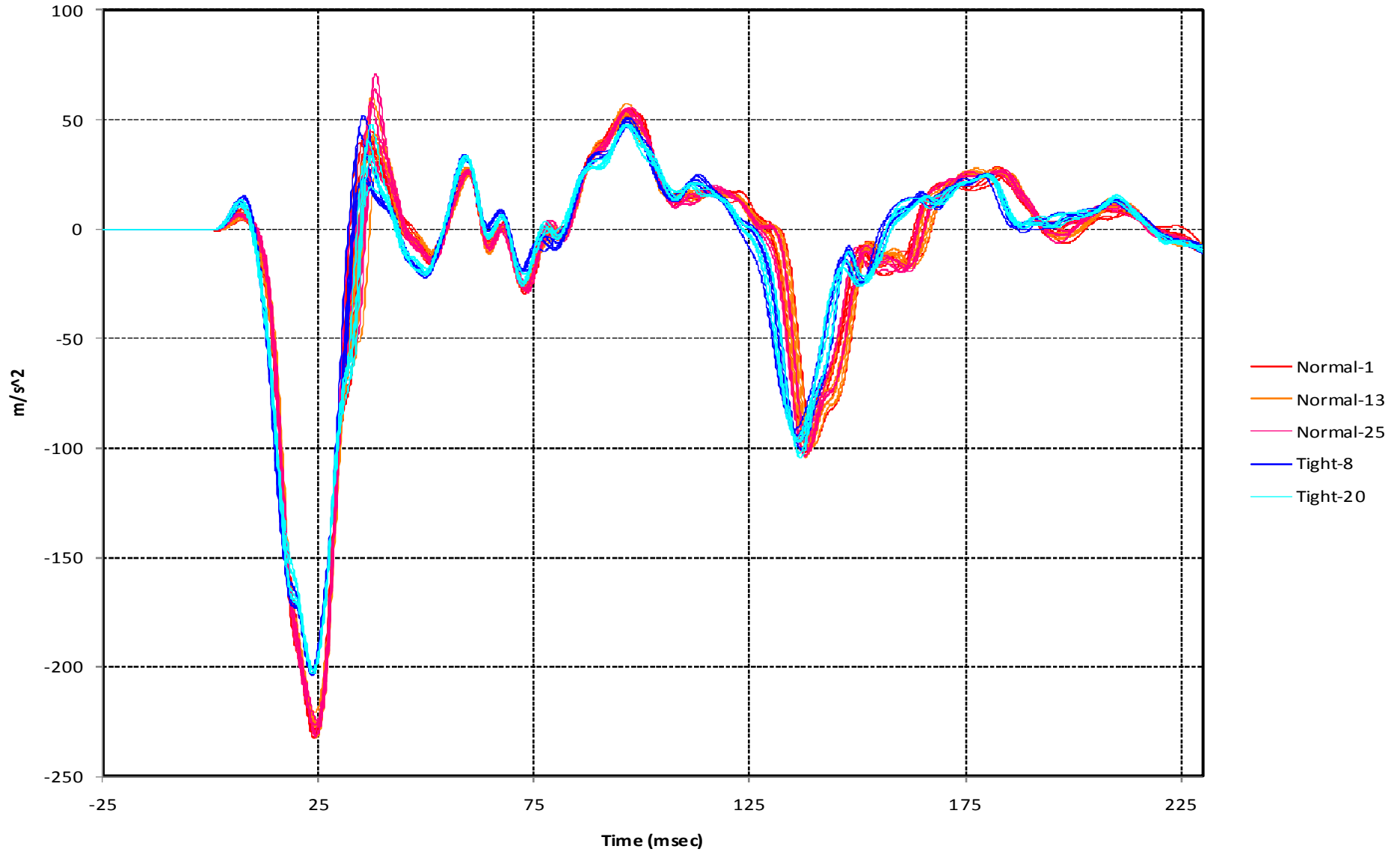
Pot B - Neck Link Rotation about T1



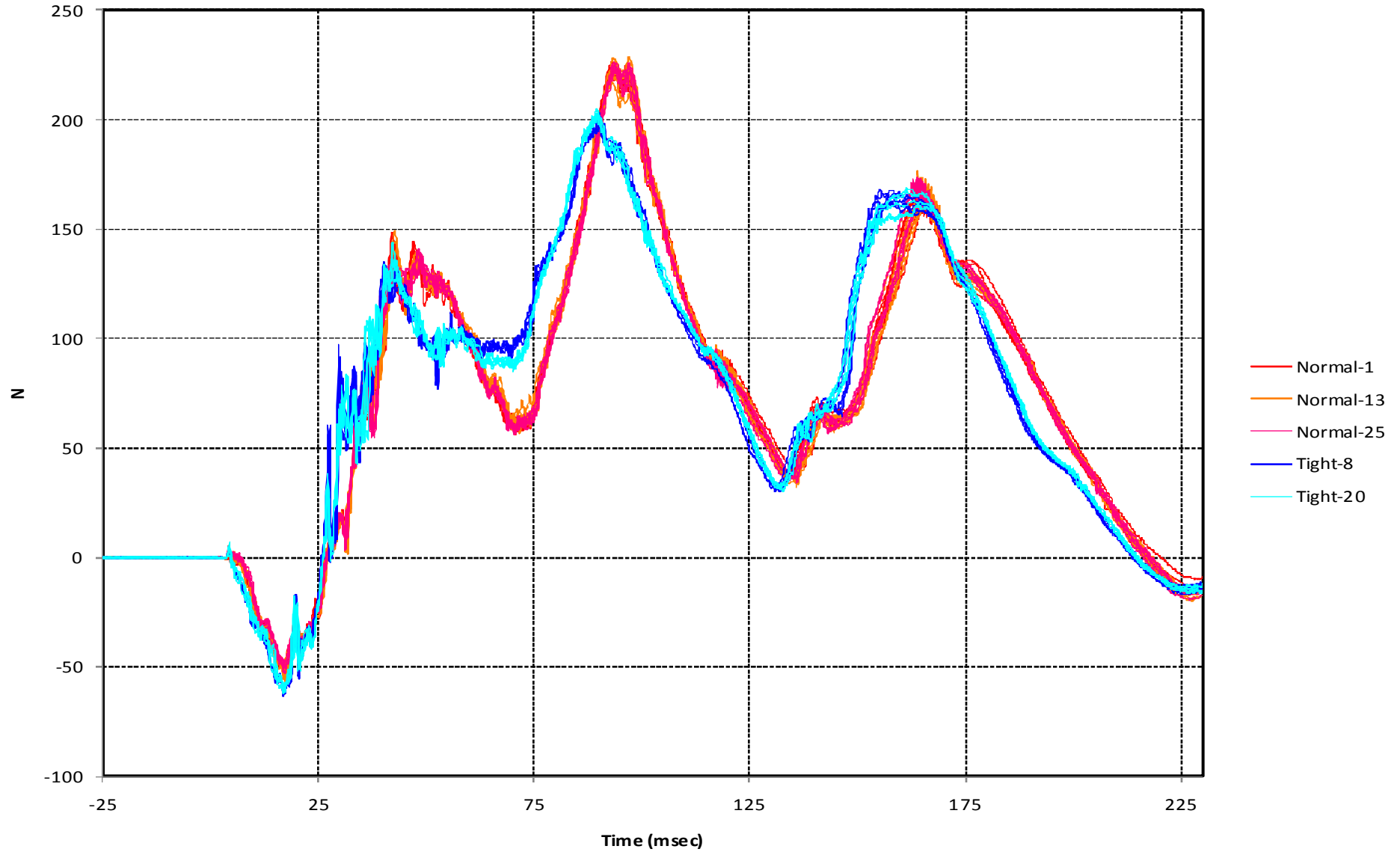
Total Head Rotation about T1



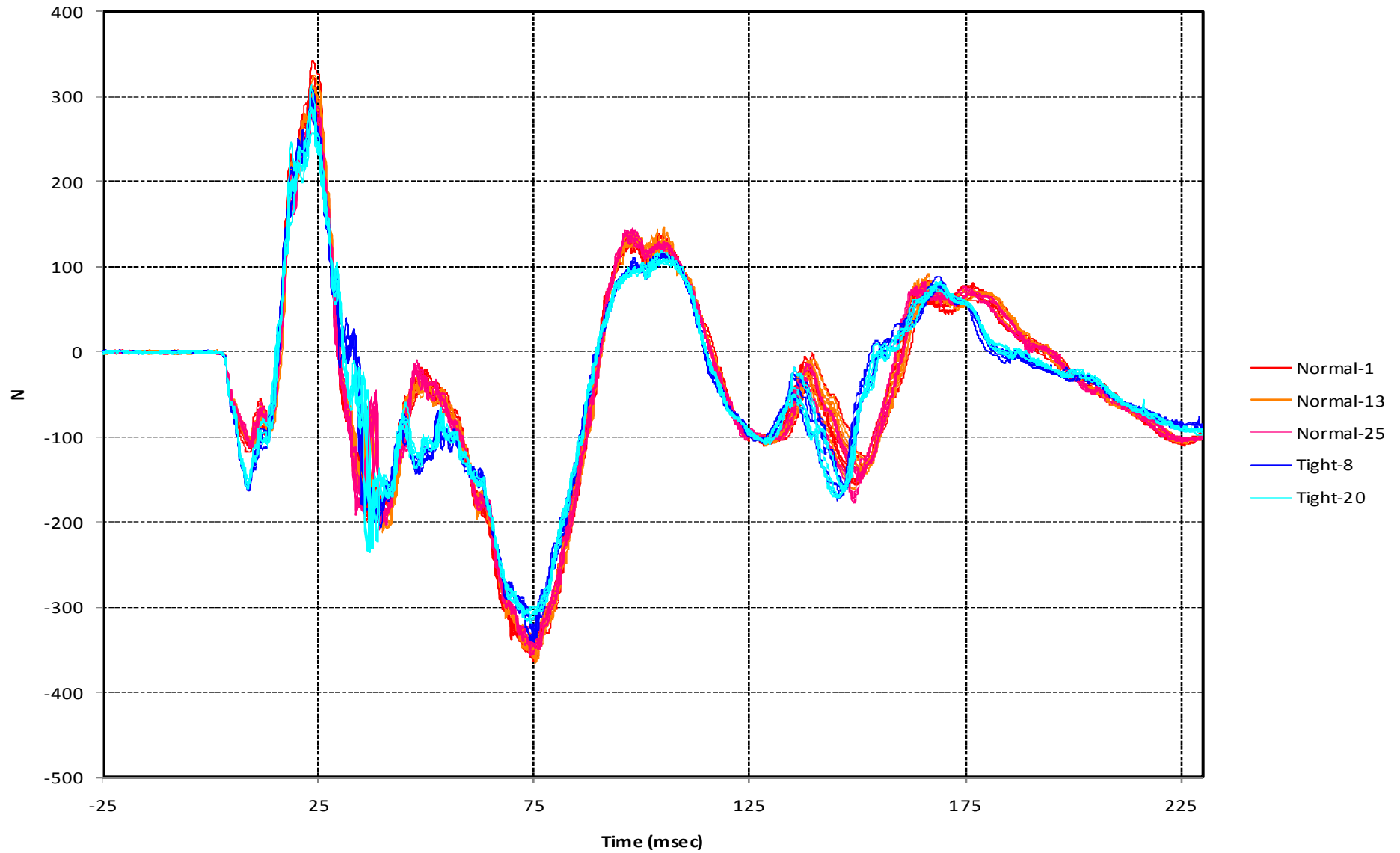
T1 X Acceleration



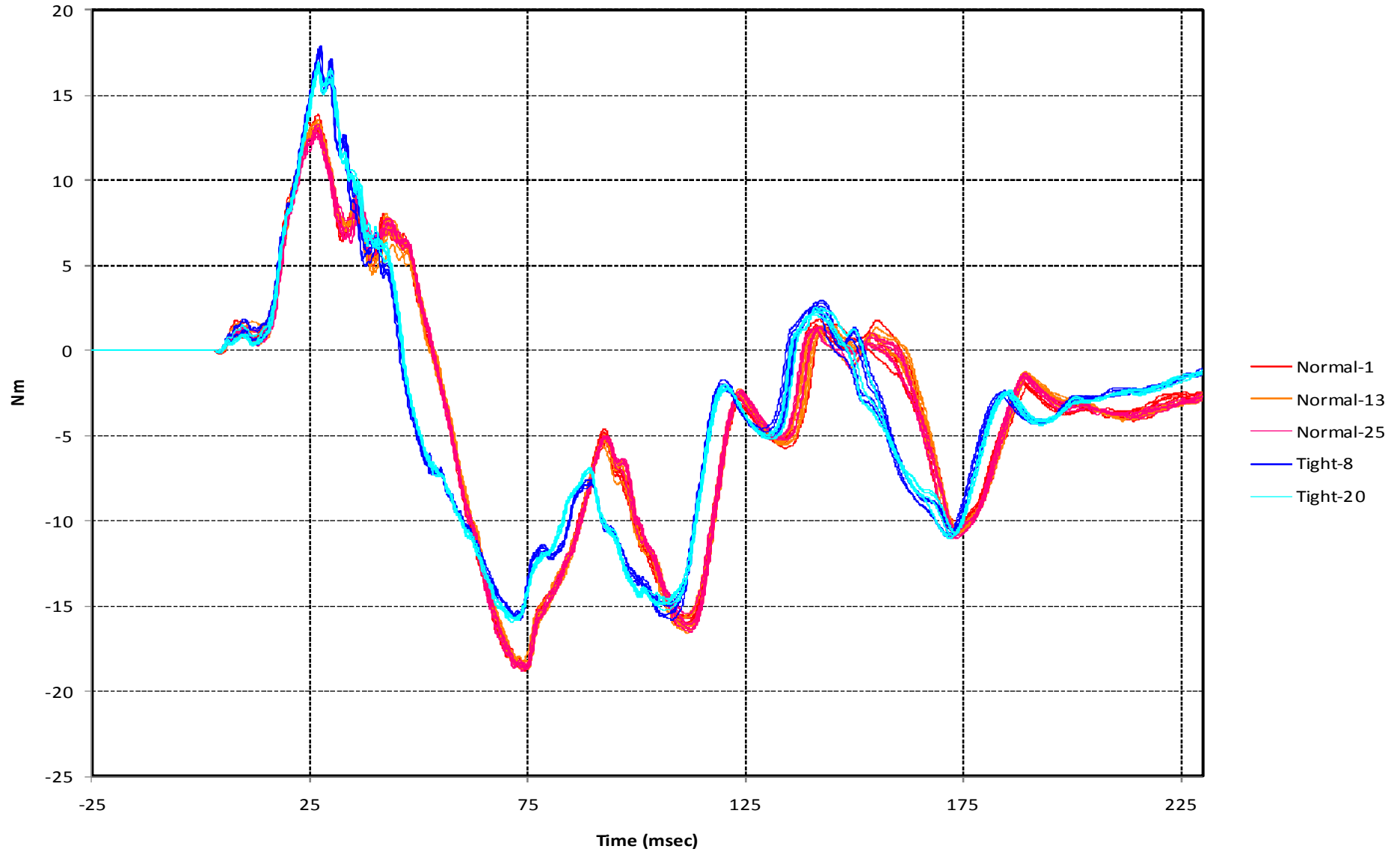
Upper Neck Force FX



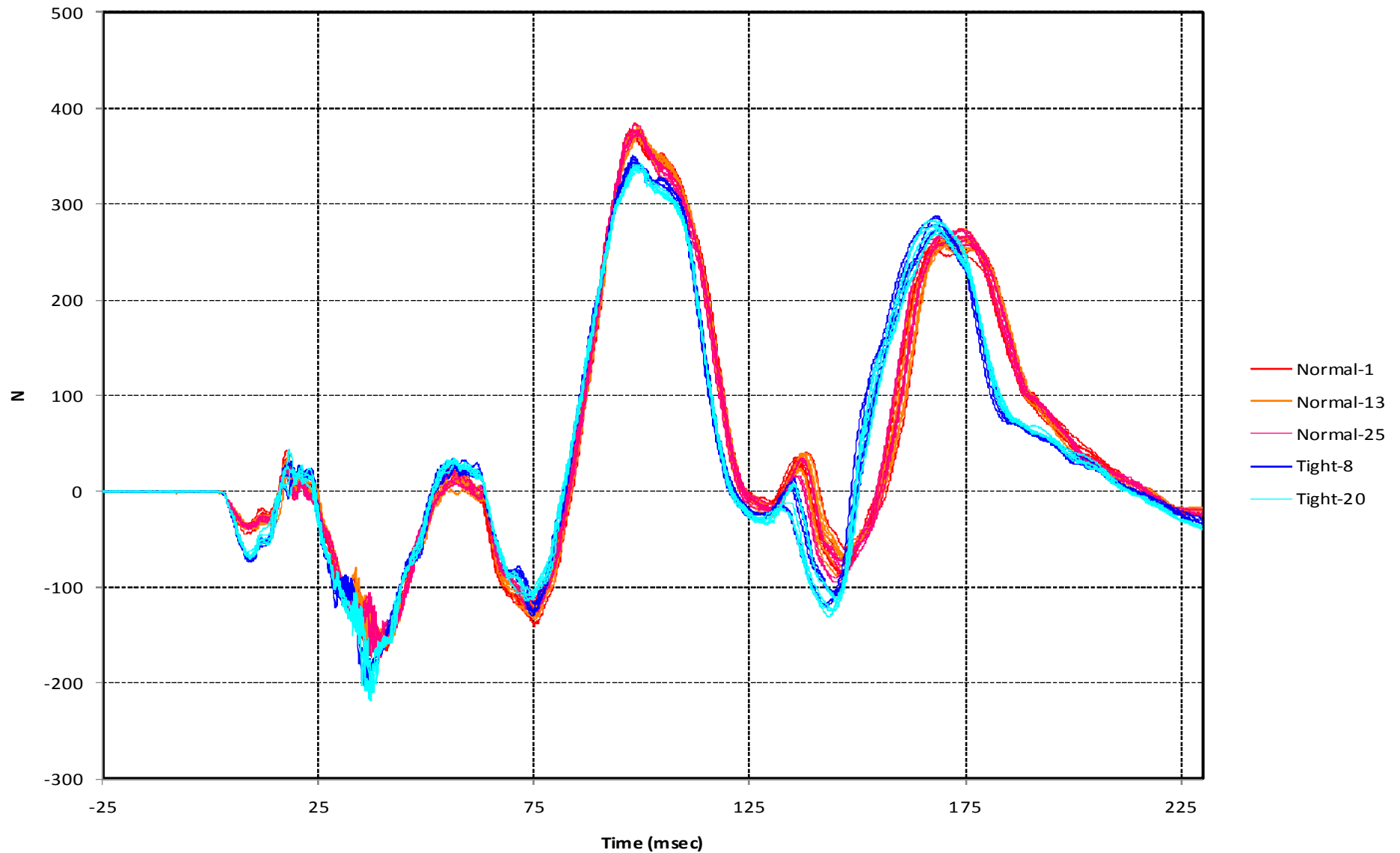
Upper Neck Force FZ



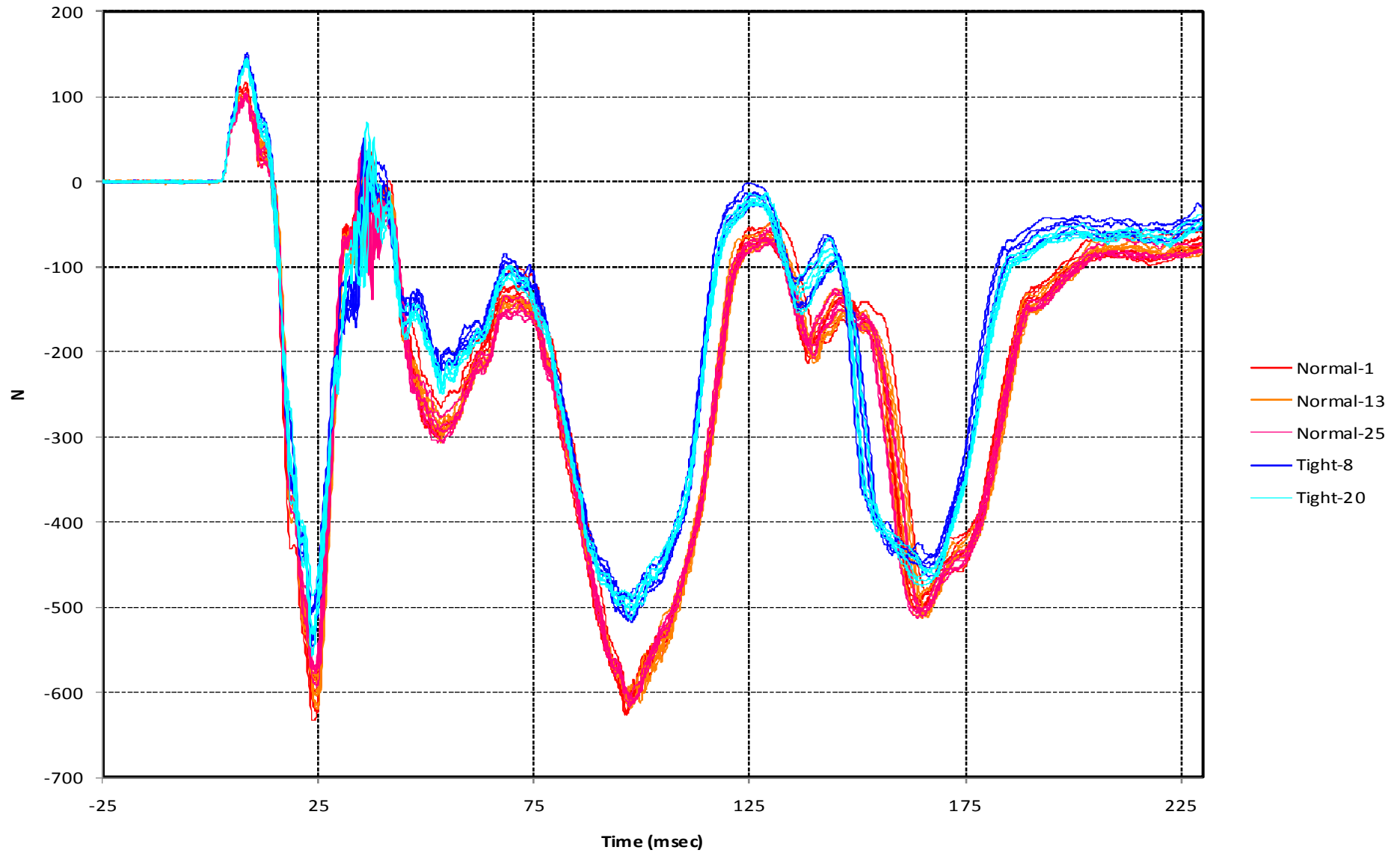
Upper Neck Moment MY



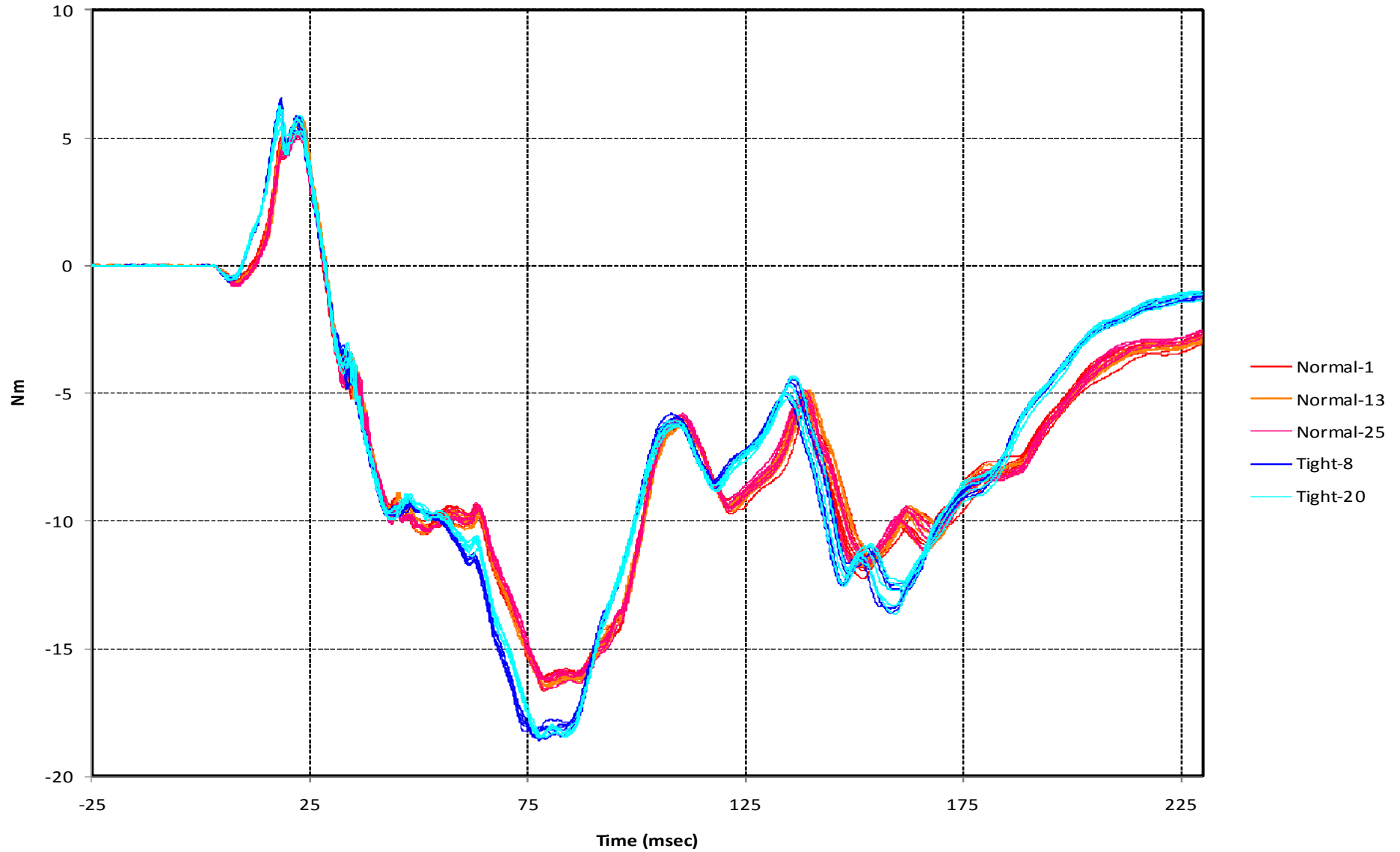
Lower Neck Force FX



Lower Neck Force FZ



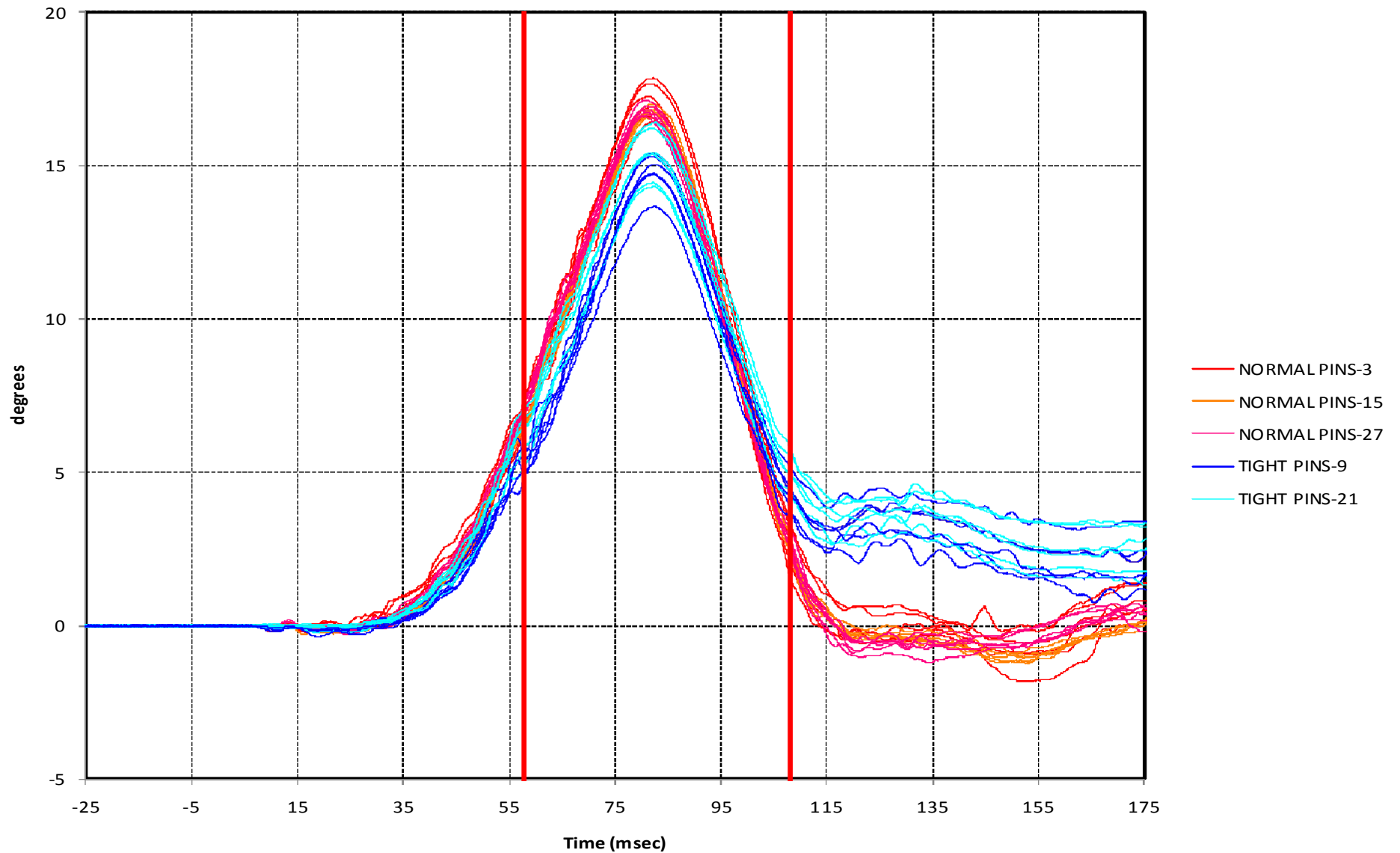
Lower Neck Moment MY



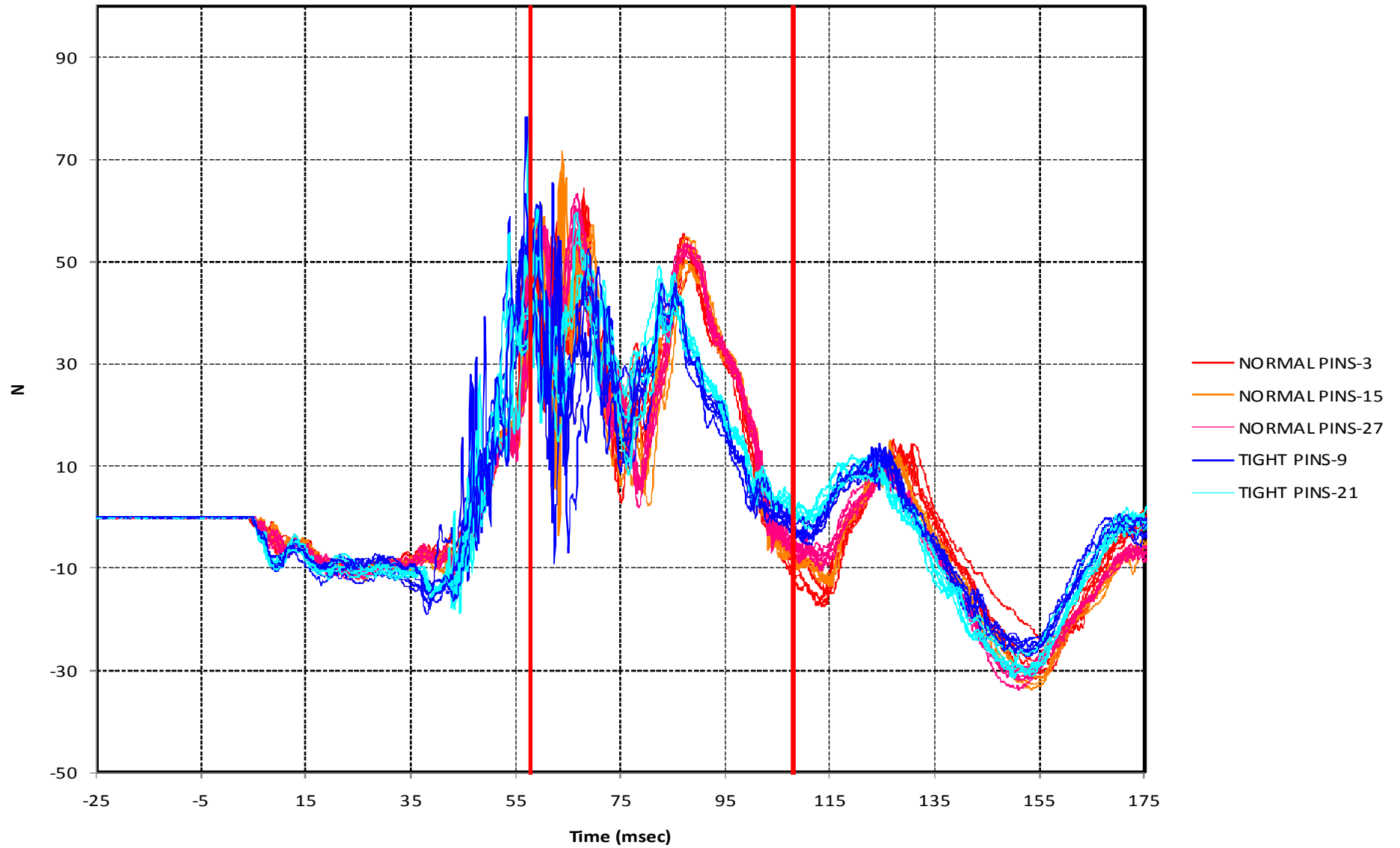
BioRID Cervical Pin Test Series

- ▶ Normal vs Tight Cervical Pins
- ▶ Dummy Certification with Head Restraint
- ▶ Tight pins were selected as being 0.018 mm larger than the normal pin to ensure a interference fit.
- ▶ Differences in Dummy Performance.

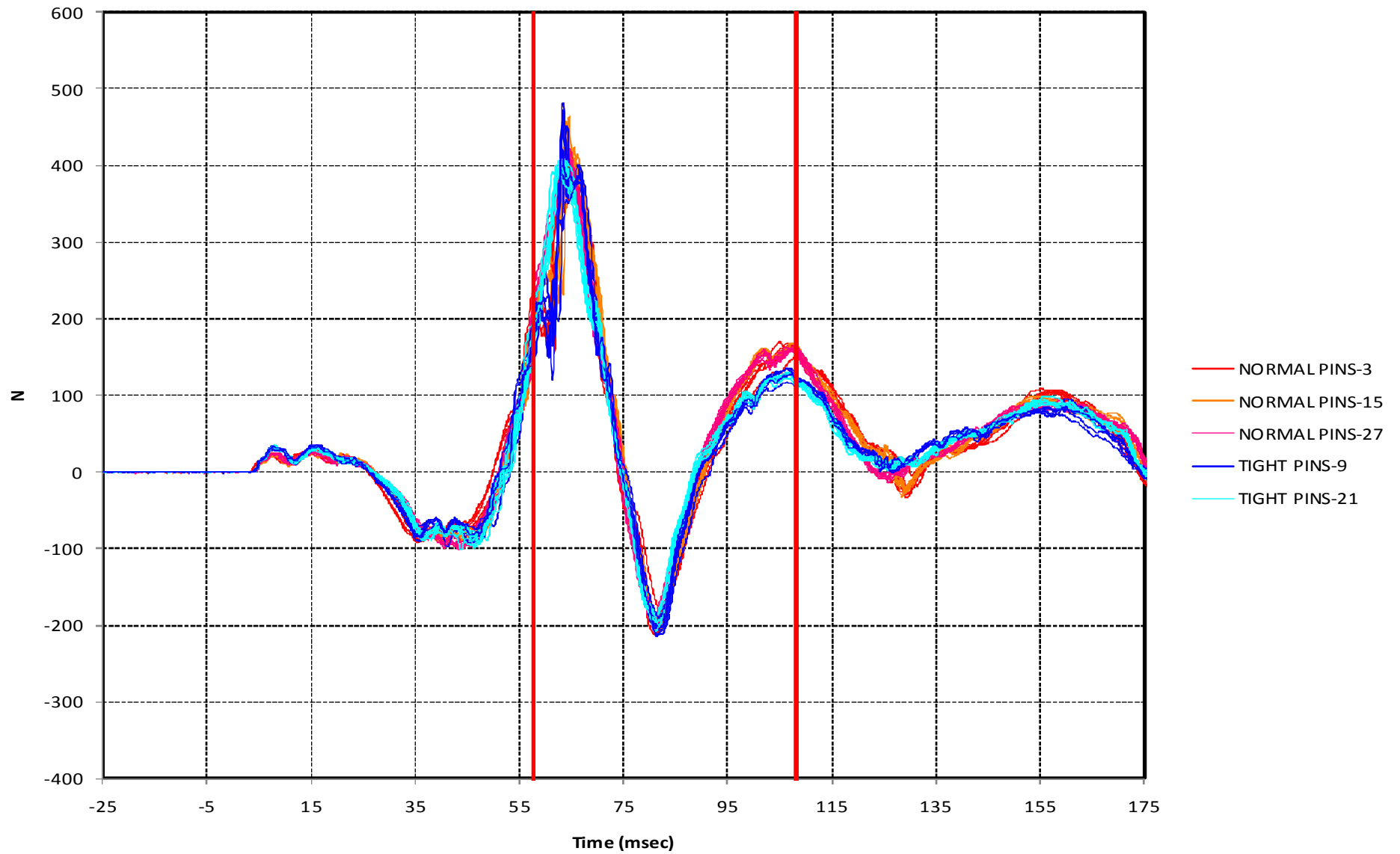
Pot A - Head Pot



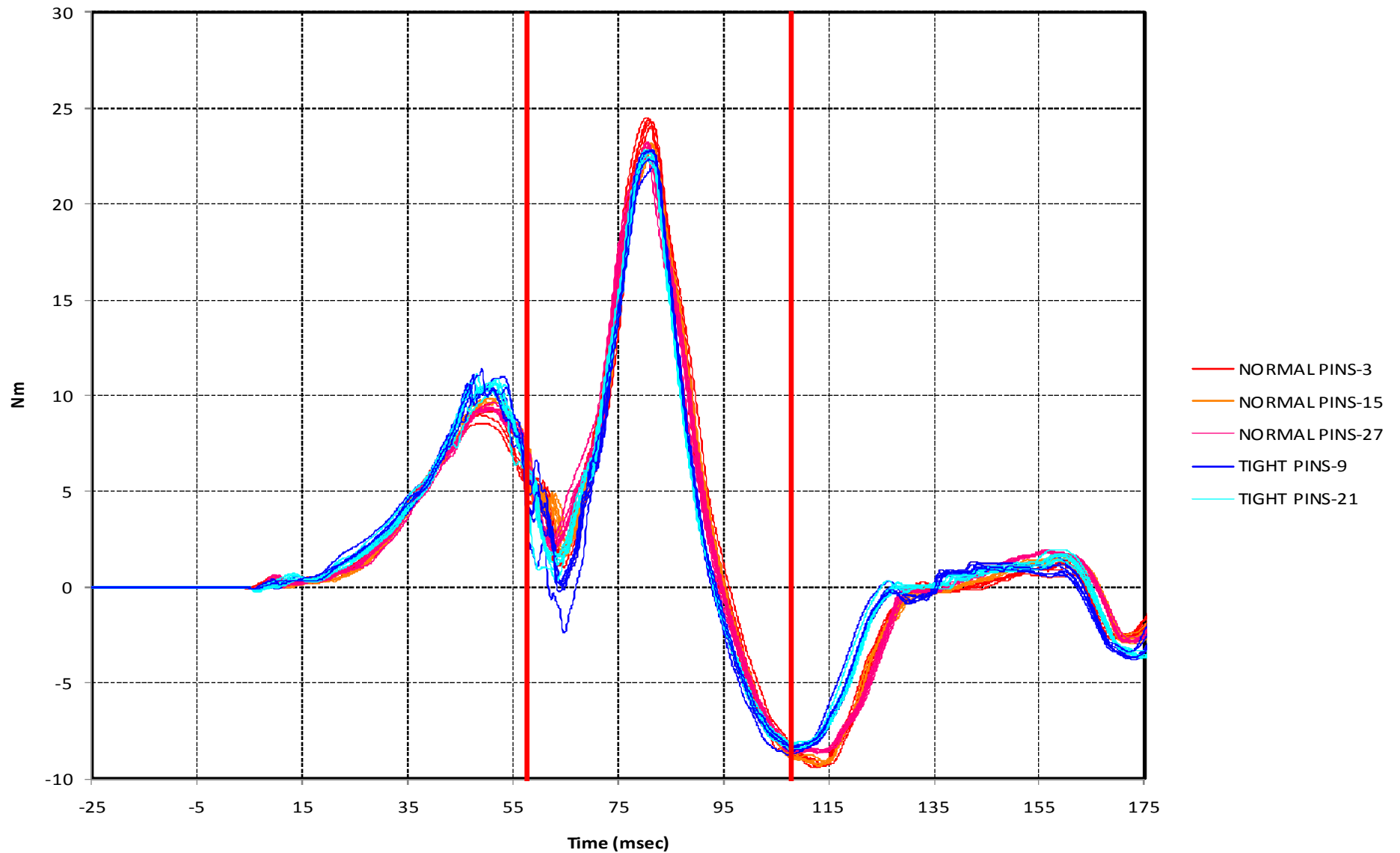
Upper Neck Force FX



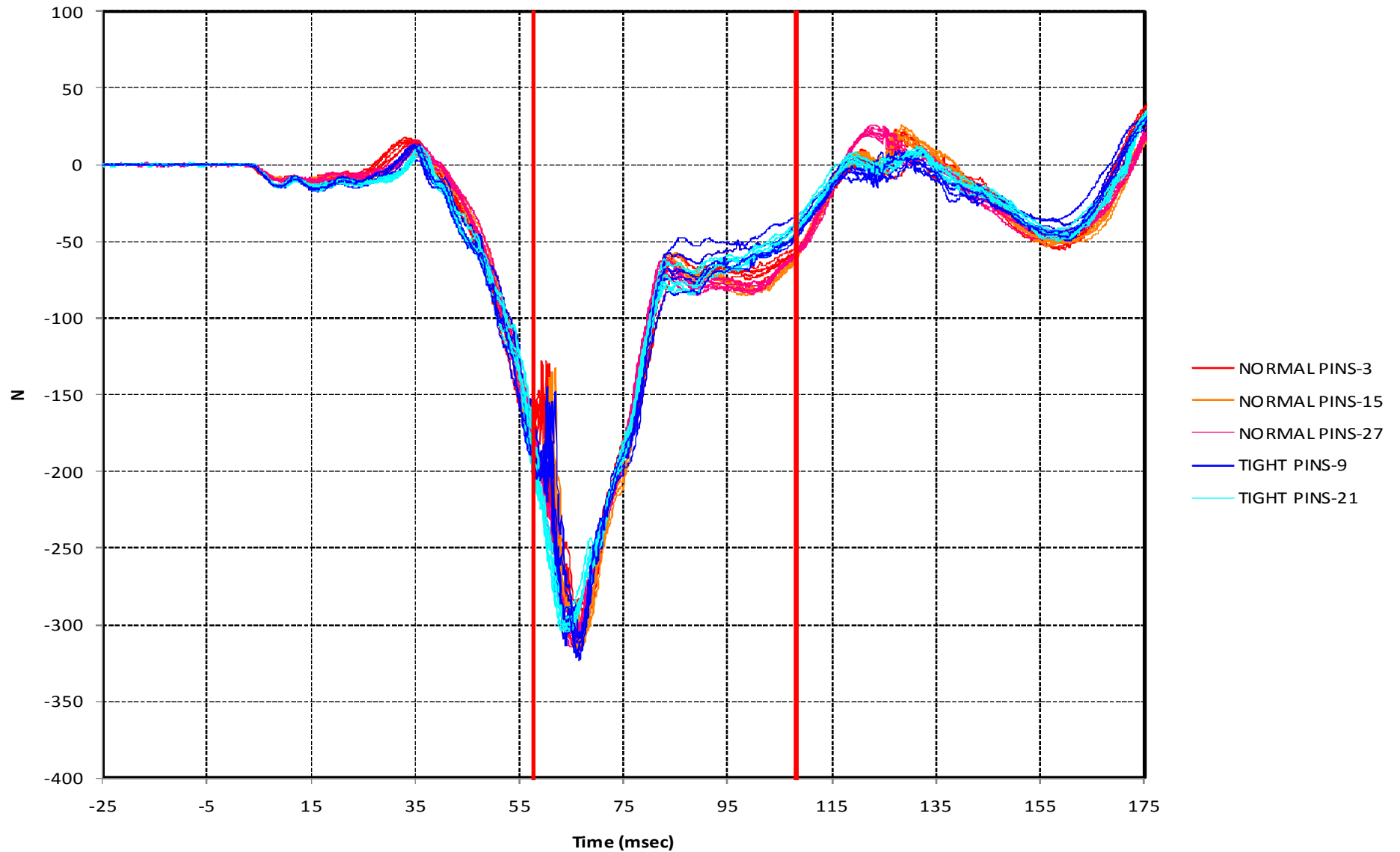
Upper Neck Force FZ



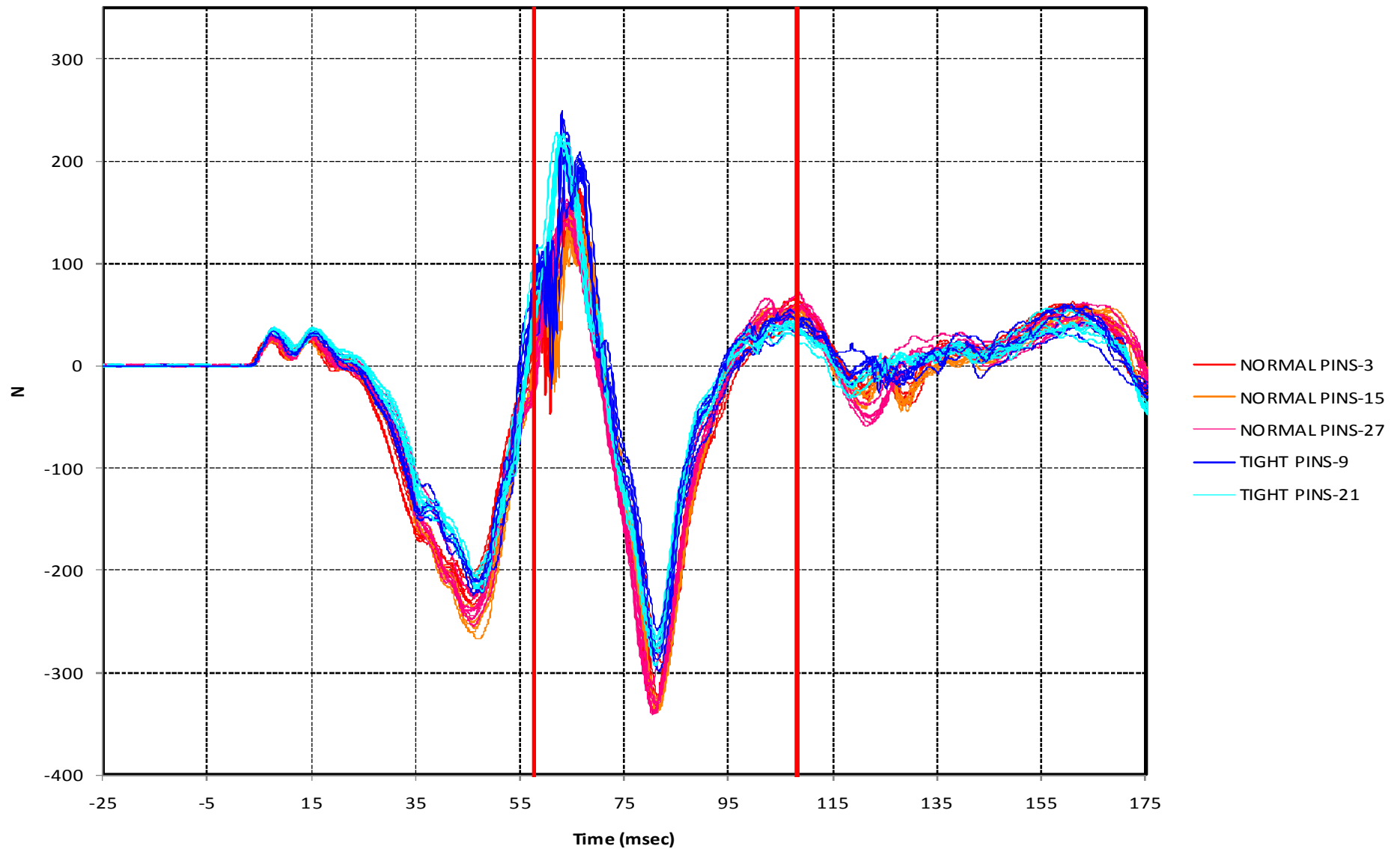
Upper Neck Moment MY



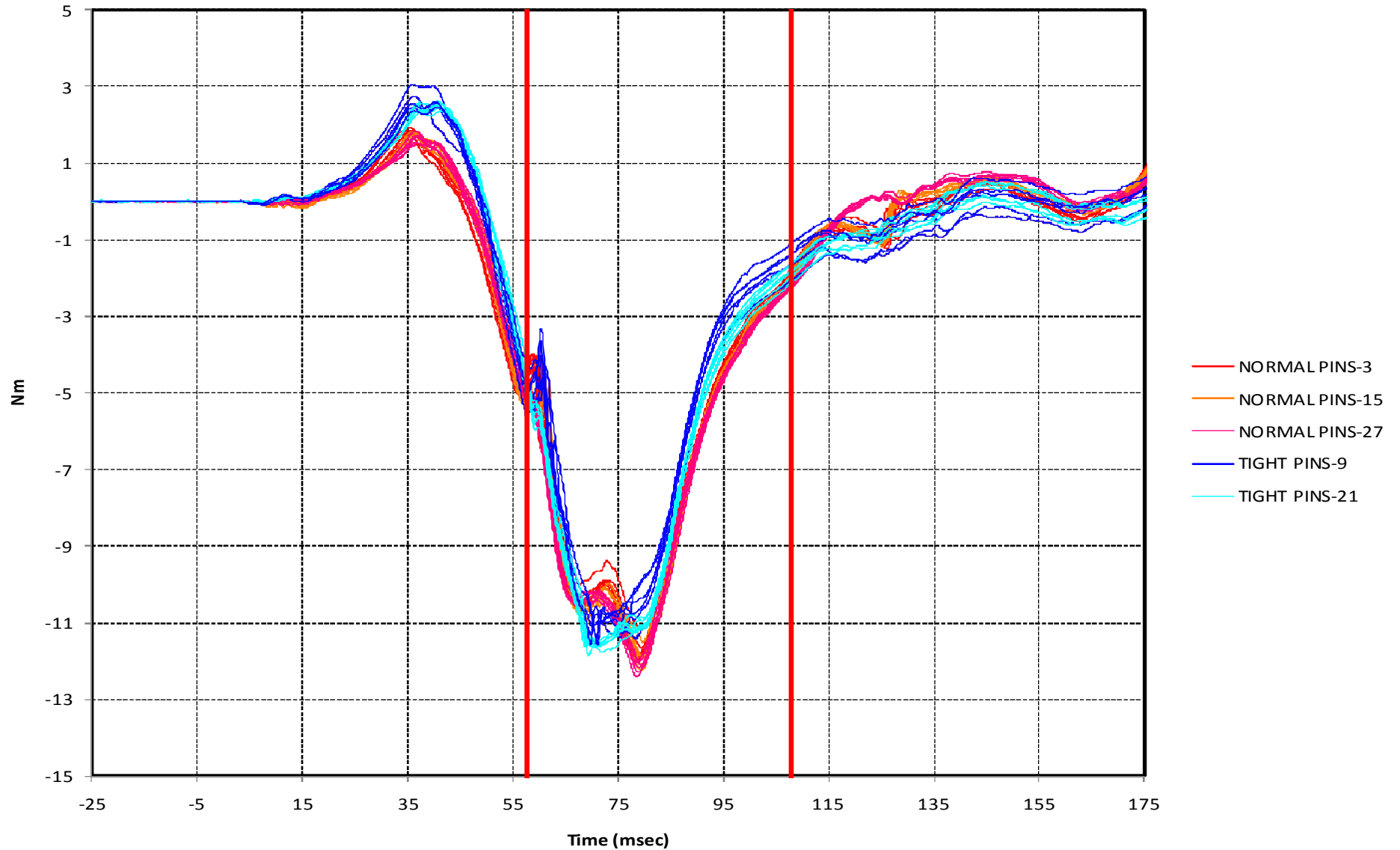
Lower Neck Force FX (T1 load Cell)



Lower Neck Force FZ (T1 load Cell)



Lower Neck Moment MY (T1 Load Cell)



BioRID Cervical Pin Test Series

- ▶ Non Rusty vs Rusty Cervical Pins
- ▶ Dummy Certification without Head Restraint

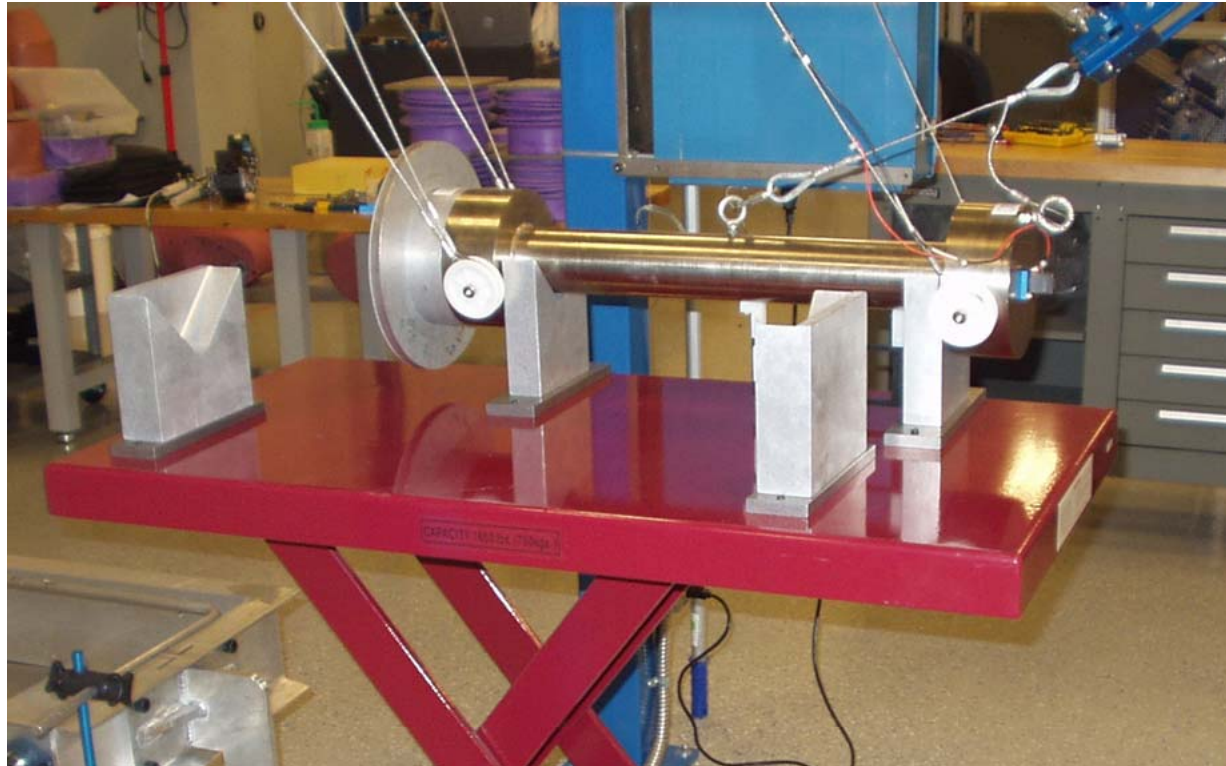
- ▶ Test Results
 - No real significant differences

BioRID II Cervical Pin Test Series

- ▶ Non Rusty vs Rusty Cervical Pins
- ▶ Dummy Certification with Head Restraint
- ▶ Used modified dummy catcher

- ▶ Test Results
 - No real significant differences

Probe Holder



Head Restraint Setup Zeroing Tool



Head Restraint Setup Zeroing Tool

- ▶ Head Rest Setup Scale Zeroing Tool



Manual Updates

- ▶ Certification and User Manual Out for review and comments
- ▶ Receiving comments on each

Future Plans

- ▶ Continue Test Setup Investigations
- ▶ Corridor Reduction

BioRID Update

▶ Thank You!!