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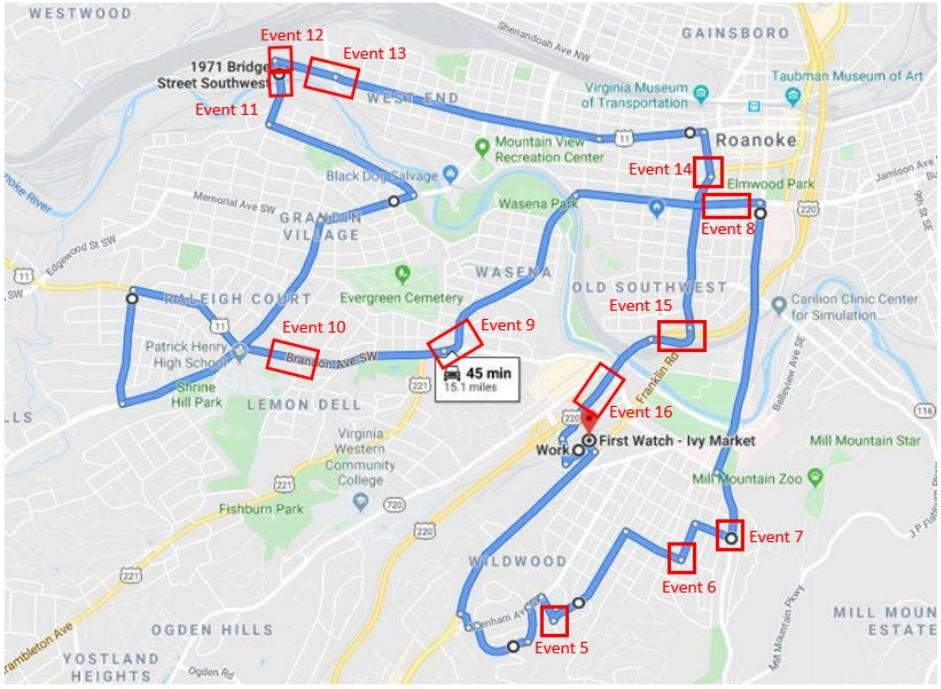
Appendix 1. Summary of events included in the driving fitness assessment.

Parking Lot/Within Facility *(not pictured on map)*



Event 1: Driving maneuver. Reverse out of parking spot, head to the right.
Event 2: Driving maneuver. From current driving aisle, turn (left or right) and drive up the next aisle to make a U-turn.
Event 3: Parking maneuver. Parallel park vehicle between the cones.
Event 4: Driving maneuver. Circle the entire traffic circle (around 1.5 times) before exiting parking lot.
Event 17: Parking maneuver. Perpendicular park vehicle in parking space.

Public Roads/Outside Facility *(pictured on map)*
Event 5: Driving maneuver. Deceleration prior to turn; acceleration and steering into a left turn onto Carolina Ave.
Event 6: Driving maneuver. Deceleration to stop at stop sign. Acceleration and steering into a left turn onto Crystal Spring Ave.
Event 7: Driving maneuver. Deceleration to stop at stop sign. Acceleration and steering into a left turn onto Yellow Mountain Road.
Event 8: Driving maneuver. Straightaway acceleration and deceleration on hilly portion of Elm Ave.
Event 9: Driving maneuver. Yield to traffic and merge onto Brandon Ave SW from Main St SW.

Event 10: Mid-drive task. After crossing Grandin Road while on Brandon Ave SW, use visor.
Event 11: Driving maneuver. Cross train tracks on Bridge St. Speed limit 25.
Event 12: Driving maneuver. Decelerate to steer into right turn onto Patterson Ave SW.
Event 13: Driving maneuver. Deceleration on Patterson Ave SW and as needed, yield to oncoming traffic from Boulevard St SW (full stop was a possibility if oncoming traffic was present).
Event 14: Driving maneuver. Deceleration prior to turn; acceleration and steering into a right turn onto Franklin Rd.
Event 15: Driving maneuver. Yield to traffic and merge onto the highway; merge into center lane. Speed limit 55 mph.
Event 16: Driving maneuver. Merge into far-right lane. Speed limit 55 mph.

Appendix 2. Patient-Reported Outcomes Measurement Information System® v2.0 Upper Extremity 7-item Short Form. Kg, kilogram

1. Are you able to carry a heavy object (over 10 pounds /5 kg)?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

2. Are you able to wash your back?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

3. Are you able to put on and take off a coat or jacket?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

4. Are you able to carry a shopping bag or briefcase?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

5. Are you able to lift 10 pounds (5 kg) above your shoulder?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

6. Are you able to change a light bulb overhead?
   a. Without any difficulty
   b. With some difficulty
   c. With much difficulty
   d. Unable to do

7. Are you able to pass a 20-pound (10 kg) turkey or ham to other people at the table?
   a. Without any difficulty

b. With some difficulty
c. With much difficulty
d. Unable to do

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Appendix 3. Post-drive self-assessment administered after every drive.

	Much worse	Somewhat worse	No different	Somewhat better	Much better
1. How do you think you performed on the driving test, compared to your normal driving?	☒	☒	☒	☒	☒
Compared to your normal driving, how would rate your ability to accomplish the following driving tasks?					
2. Parallel parking	☒	☒	☒	☒	☒
3. Perpendicular parking	☒	☒	☒	☒	☒
4. U-turns	☒	☒	☒	☒	☒
5. Driving in reverse	☒	☒	☒	☒	☒
6. Changing lanes	☒	☒	☒	☒	☒
7. Making left turns	☒	☒	☒	☒	☒
8. Making right turns	☒	☒	☒	☒	☒
9. General driving on surface streets	☒	☒	☒	☒	☒

Did you at any point in the drive, feel unsafe with your driving abilities? If so, please explain.

Appendix 4. Intra/post driving assessment of subject by in-car monitor for every drive.

1. Were there any incidents or adverse events, serious adverse events? If so, please explain.

2. Were there any near crashes*? Did the experimenter have to use the rear controls at any point? If so, please explain.

3. Did the participant express that they felt unsafe?

4. Did you, the experimenter, feel that the driver was unsafe at any time during the study? If so, please explain.

5. Did the driver leave the parking lot? If not, why?

6. Was the route changed? Why?

7. Did the driver miss a turn/ command from the research driver? If so, please explain.

*Near crash as defined by VTTI is any circumstance requiring a rapid evasive maneuver by the subject vehicle or any other vehicle, pedestrian, cyclist, or animal to avoid a crash.

IRB NUMBER: IRB-19-616
IRB APPROVAL DATE: 10/21/

Subject ID: _____ Drive #: _____Date: _____ Drive Examiner Name: _____
Subject Age: _____ Drive Start Time: _____
Subject Sex: _____ Drive End Time: _____

How do you rate the driver's ability to successfully merge onto roadways, navigate the route, drive in reverse, and complete the parking tasks (parallel parking and perpendicular parking)?

	Unable	Able, with much difficulty	Able, with moderate difficulty	Able, with slight difficulty	Able, with no difficulty
Merging onto roadways	☒	☒	☒	☒	☒
Navigation of the planned route	☒	☒	☒	☒	☒
Parallel parking	☒	☒	☒	☒	☒
Reverse driving	☒	☒	☒	☒	☒
Perpendicular parking	☒	☒	☒	☒	☒

Was the subject able to complete the following:

	Unable	Able
Use the visor	☒	☒
Perform a U-turn in the parking lot	☒	☒
Perform lane changes	☒	☒

Appendix 5. Non-inferiority limits. Mph, miles per hour; kph, kilometers per hour; g, gravitational force equivalent; s, second

- Speed: 10 mph (16 kph)
- Lateral Acceleration: 0.05g
    - *Equivalent to taking a standard city corner at 10.6 mph versus 10 mph*
- Longitudinal Acceleration: 0.05g
    - *Equivalent to acceleration from 0 to 60 mph in 7 seconds versus 8 seconds*
- Longitudinal Jerk: 0.25 g/sec
- Lateral Jerk: 0.25 g/sec
- Steering Wheel Angle: 30 degrees
    - *Equivalent to turning the steering wheel from the 12 o'clock position to 1 o'clock position*
- Yaw: 10 degrees/s

Appendix 6. Effect of rotator cuff repair on driving fitness, measured by thirteen kinematic metrics across fourteen driving events. Postop, postoperative; SE, standard error; kph, kilometers per hour, sec, second; CI, confidence interval; g, gravitational force equivalent

Means ± standard errors, estimated differences (baseline ─ postoperative), and 95% confidence intervals comparing baseline to postoperative kinematic metrics. Green boxes indicate metrics with detectable differences in the conservative direction, while red boxes indicate metrics with detectable differences in the reckless direction.

Kinematic Metric	Outcome	Baseline	Postoperative Week			
			2	4	6	12
Mean speed *(kph)*	Mean*	27.6 ± 1.1	27.8 ± 1.1	27.3 ± 1.1	27.6 ± 1.0	27.5 ± 1.1
	Estimated difference†		−0.3 (−0.9 to 0.3)	−0.2 (−0.8 to 0.4)	-0.3 (−0.9 to 0.3)	−0.2 (−0.9 to 0.4)
Standard deviation of speed *(kph)*	Mean*	5.9 ± 0.2	5.7 ± 0.2	5.7 ± 0.2	5.6 ± 0.2	5.9 ± 0.2
	Estimated difference†		0.21 (−0.03 to 0.44)	0.09 (−0.15 to 0.32)	0.20 (−0.04 to 0.43)	−0.02 (−0.25 to 0.22)
Minimum longitudinal acceleration *(g)*	Mean*	−0.046 ± 0.005	−0.036 ± 0.004	−0.028 ± 0.004‡	−0.034 ± 0.004‡	−0.026 ± 0.004‡
	Estimated difference†		−0.011 (−0.020 to −0.003)	−0.018 (−0.027 to −0.010)‡	−0.012 (−0.020 to −0.004)‡	−0.021 (−0.030 to −0.013)‡
Maximum longitudinal acceleration *(g)*	Mean*	0.242 ± 0.005	0.242 ± 0.004	0.241 ± 0.004	0.242 ± 0.004	0.253 ± 0.004§
	Estimated difference†		−0.0005 (−0.0065 to 0.0055)	0.0008 (−0.0051 to 0.0068)	−0.0005 (−0.0065 to 0.0054)	−0.0109 (−0.0168 to −0.0050)§
Standard deviation of longitudinal acceleration *(g)*	Mean*	0.074 ± 0.002	0.072 ± 0.002	0.069 ± 0.002‡	0.070 ± 0.002	0.071 ± 0.002
	Estimated difference†		0.002 (−0.001 to 0.005)	0.005 (0.002 to 0.008)‡	0.003 (0.000 to 0.006)	0.003 (0.000 to 0.006)
Maximum absolute lateral acceleration *(g)*	Mean*	0.189 ± 0.004	0.191 ± 0.004	0.193 ± 0.004	0.194 ± 0.004	0.199 ± 0.004
	Estimated difference†		−0.003 (−0.009 to 0.002)	−0.004 (−0.010 to 0.001)	−0.005 (−0.010 to 0.001)	−0.009 (−0.015 to 0.004)
Standard deviation of lateral acceleration *(g)*	Mean*	0.057 ± 0.001	0.057 ± 0.001	0.058 ± 0.001	0.057 ± 0.001	0.060 ± 0.001
	Estimated difference†		−0.0002 (−0.0022 to 0.0017)	−0.0009 (−0.0028 to 0.0010)	−0.0001 (−0.0020 to 0.0018)	0.0027 (−0.0046 to −0.0007)

Maximum longitudinal jerk *(milli-g/sec)*	Mean*	0.790 ± 0.020	0.770 ± 0.019	0.740 ± 0.018	0.770 ± 0.019	0.790 ± 0.024
	Estimated difference†		0.016 (−0.027 to 0.060)	0.046 (0.003 to 0.089)	0.016 (−0.027 to 0.059)	−0.003 (−0.046 to 0.040)
Maximum lateral jerk *(milli-g/sec)*	Mean*	1.220 ± 0.029	1.250 ± 0.032	1.220 ± 0.031	1.170 ± 0.030	1.100 ± 0.027‡
	Estimated difference†		−0.024 (−0.071 to 0.024)	0.005 (−0.042 to 0.052)	0.051 (0.006 to 0.098)	0.120 (0.074 to 0.168)‡
Maximum absolute steering wheel angle *(deg)*	Mean*	131 ± 6	130 ± 6	128 ± 6	129 ± 6	131 ± 6
	Estimated difference†		1.6 (−1.6 to 4.8)	3.6 (0.3 to 6.8)	3.3 (0.1 to 6.4)	2.0 (−1.2 to 5.1)
Standard deviation of steering wheel angle *(deg)*	Mean*	47 ± 2	46 ± 2	46 ± 2	46 ± 2	47 ± 2
	Estimated difference†		0.8 (−0.5 to 2.0)	1.2 (−0.1 to 2.4)	0.7 (−0.6 to 1.9)	0.8 (−0.4 to 2.0)
Maximum absolute yaw *(deg/sec)*	Mean*	13.8 ± 0.5	13.7 ± 0.5	13.6 ± 0.5	13.8 ± 0.5	14.2 ± 0.5
	Estimated difference†		0.09 (−0.22 to 0.41)	0.23 (−0.08 to 0.55)	0.01 (−0.30 to 0.32)	−0.21 (−0.53 to 0.10)
Standard deviation of yaw *(deg/sec)*	Mean*	4.4 ± 0.2	4.4 ± 0.2	4.4 ± 0.2	4.4 ± 0.2	4.6 ± 0.2
	Estimated difference†		0.04 (−0.08 to 0.16)	0.03 (−0.08 to 0.15)	0.03 (−0.09 to 0.15)	−0.10 (−0.22 to 0.02)

*The values are given as the mean and the standard error. g = gravitational force equivalent. †The values are given as the estimated differences (baseline − postoperative), with the 95% CIs of kinematic metrics that showed a detectable difference when comparing baseline with postoperative drives within specific maneuver types. ‡Detectable differences in the conservative direction. §Detectable differences in the reckless direction.

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Appendix 7. Hand use and steering wheel placement (either on the upper half or lower half) as a percentage of total time. Means and 95% CIs at baseline, postoperative week two, and postoperative week twelve are pictured. RTCR, rotator cuff repair; postop wk, postoperative week.

NOTE: For drives where the sum of upper and lower steering wheel percentages do not add up to 100%, the hand being evaluated was not placed on the steering wheel for the remainder of the time.