matter of the test brains using a biopsy punch and secured to the plates on the device using a dab of super glue. The rod was accelerated to 2.5 m/s with the bounce enhanced speed of the LCM observed to be approximately 3m/s, making the strain rate tested 750 s^{-1}. The experiment was filmed with a Phantom v210 High speed camera at 8200 frames per second. The encoder was not available for these preliminary tests so only load against time data was obtained and the approximate speed of the LCM was estimated from the high speed video.

III. INITIAL FINDINGS

It was observed during sample preparation that the act of cutting the sample seemed to greatly weaken it. While the brain as a whole was capable of maintaining its macroscopic shape, smaller samples were observed to almost disintegrate, becoming more like a gel than a solid. Initial tests showed a fairly typical load curve shape consistent with a viscoelastic solid, but at lower stress values than expected from literature [4]. The sample exhibited a breaking stress of approximately 100 Pa. Analysis of the high-speed videos (Figure 2) showed the sample deforming uniformly during the experiment, indicating a smooth strain field. The video also confirmed constant velocity stretching.

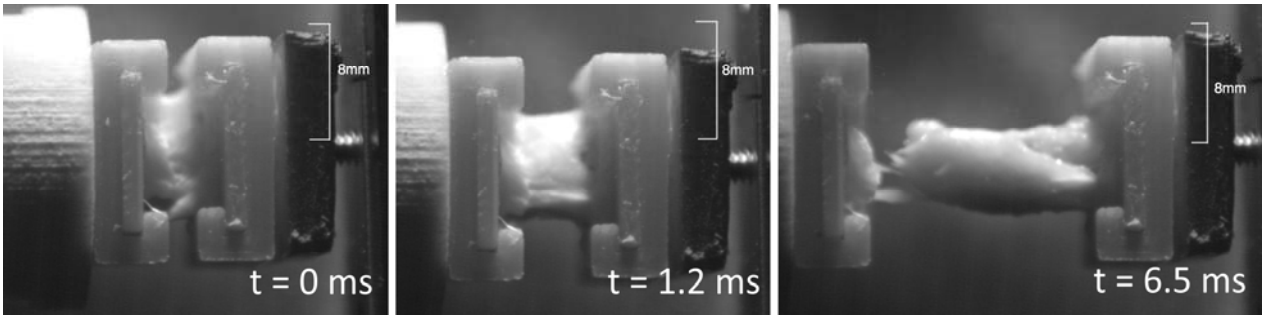

Figure 2: High speed video stills showing i) initial conditions, ii) uniform deformation and iii) breaking point.

IV. DISCUSSION

An apparatus was developed to test brain tissue at high strain rates in both tension and compression, with promising early test results. An interesting observation was that samples appeared weaker than the brain. This phenomenon has not been reported in literature and could be specific to lamb brains or a consequence of the comparatively long post mortem time of the tissue. It is theorised, however, that small samples have considerably less mechanical reinforcement from axons, which typically have a length scale several times larger than the sample size. While these axons exist in the sample, they are no longer anchored in adjacent tissue and this cross section of their length has a much lower *tangle factor*, which could explain this comparative weakness. More tests are needed on a variety of tissue with a stricter post mortem procedure, but these initial results could imply that small sample testing may not be a suitable method for brain tissue characterisation.

V. REFERENCES

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