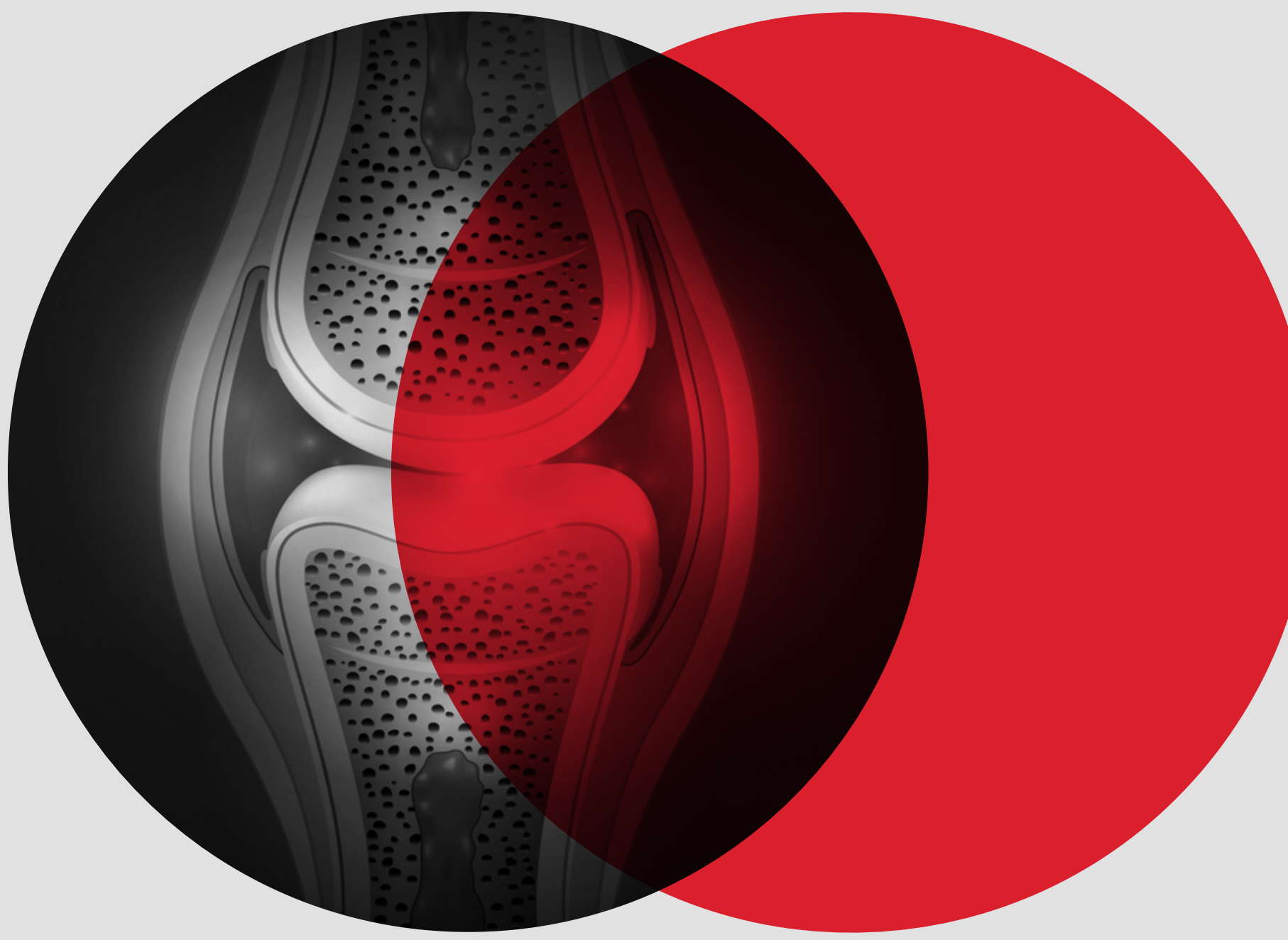


# Preservation of Synovial Fluid with Dimethyl Sulfoxide (DMSO)



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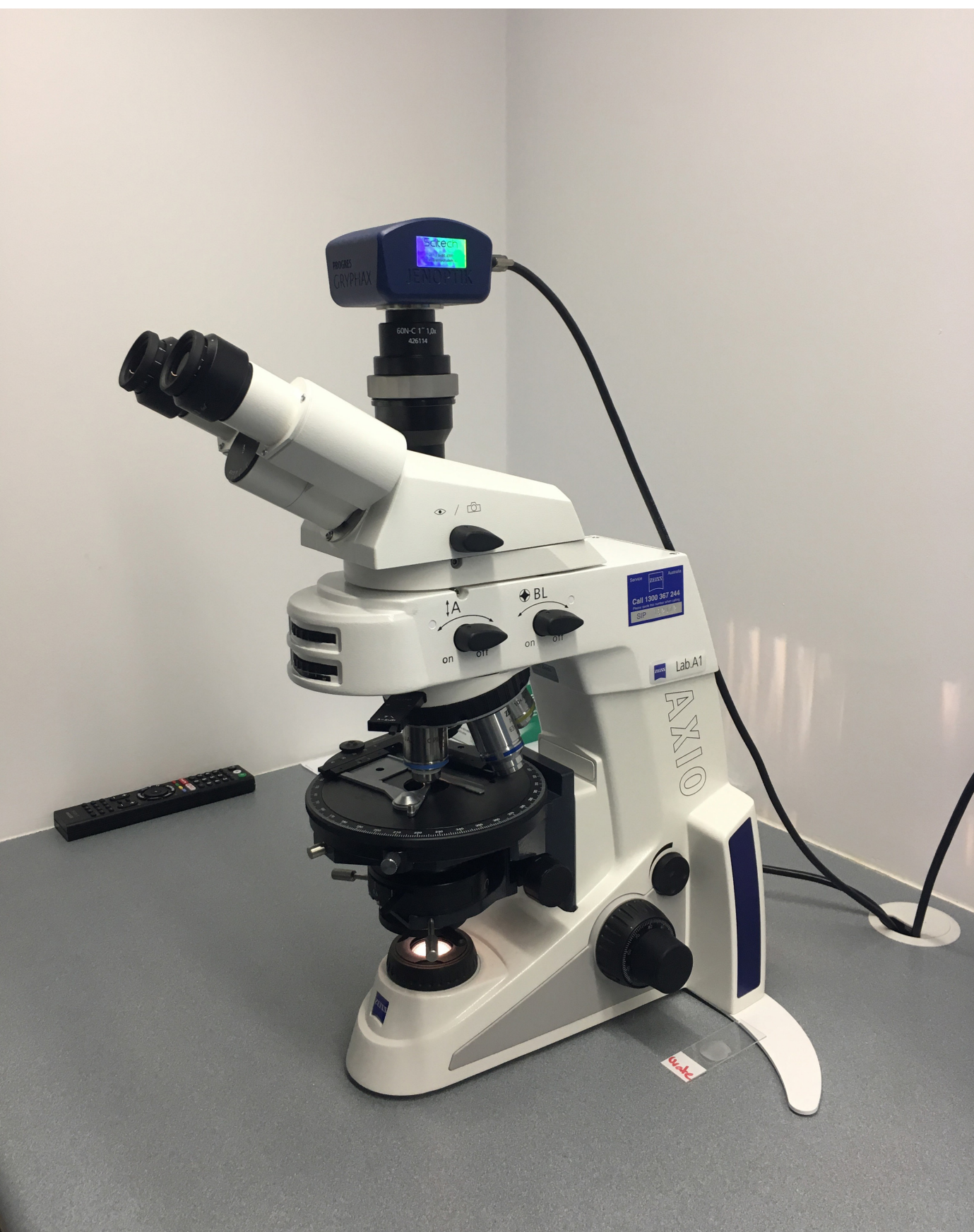
The Synovial Fluid RCPAQAP provides 25µl aliquots of synovial fluid (SF), most containing urate or calcium pyrophosphate crystals, to laboratories to assess accuracy of SF examination for crystals. The educational and quality assurance value of the samples is influenced by the integrity of the SF cells at the time of examination, after travelling by post/courier for up to several days to destinations throughout Australia, New Zealand and internationally. The aim of this study was to assess whether addition of dimethyl sulfoxide (DMSO), a cryoprotective chemical used in stem cell transplantation, would help maintain SF cellular morphology.

## Methods

- SFs obtained for routine clinical care, irrespective of underlying condition, were collected.
- Each SF was aliquoted into 24 samples, with half having DMSO added to achieve 10% concentration (“+DMSO”). Half the fluids were stored at room temperature (RT) and half at -80°C.
- Samples were photographed (40x objective) by KP at 1, 2, 3, 6, 7, & 8 weeks. The photographs were de-ordered and cellular morphology was graded by NM.
- Data analysis via SPSS with help from statistician; ordinal logistic regression used to compare cellular morphology grade across groups.

Grading for Cell Morphology	
1	Intact Cell Membrane/Cellular Morphology – “Fresh”
2	Partially Ruptured Cell Membrane
3	Severely Ruptured or Not Visible Cell Membrane/Cell Identifiable
4	Cellular Debris Not Confined to Shape of Cell

Yes/No	Grading for Artefacts and Clumping
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Microscope linked to camera and 0.5mL polypropylene tubes used for storing the synovial fluid.



## Results

15 Patients recruited with preliminary analysis of 7 complete studies and 4 “in progress” studies. >200 photographs.

### Cell Grade

Relative to +DMSO -80°C:  
Odds of +DMSO RT having worse cell grade is 2.5x greater (p=.039, 95% CI 1.05–5.91)  
Odds of -DMSO -80°C having worse cell grade is 1.3x greater (p=.467, 95% CI 0.66–2.50)  
Odds of -DMSO RT having worse cell grade is 2.2x greater (p=.151, 95% CI 0.76–6.15)  
Trend: DMSO -80°C > No DMSO -80°C > No DMSO RT > DMSO RT

### Presence of Artefact

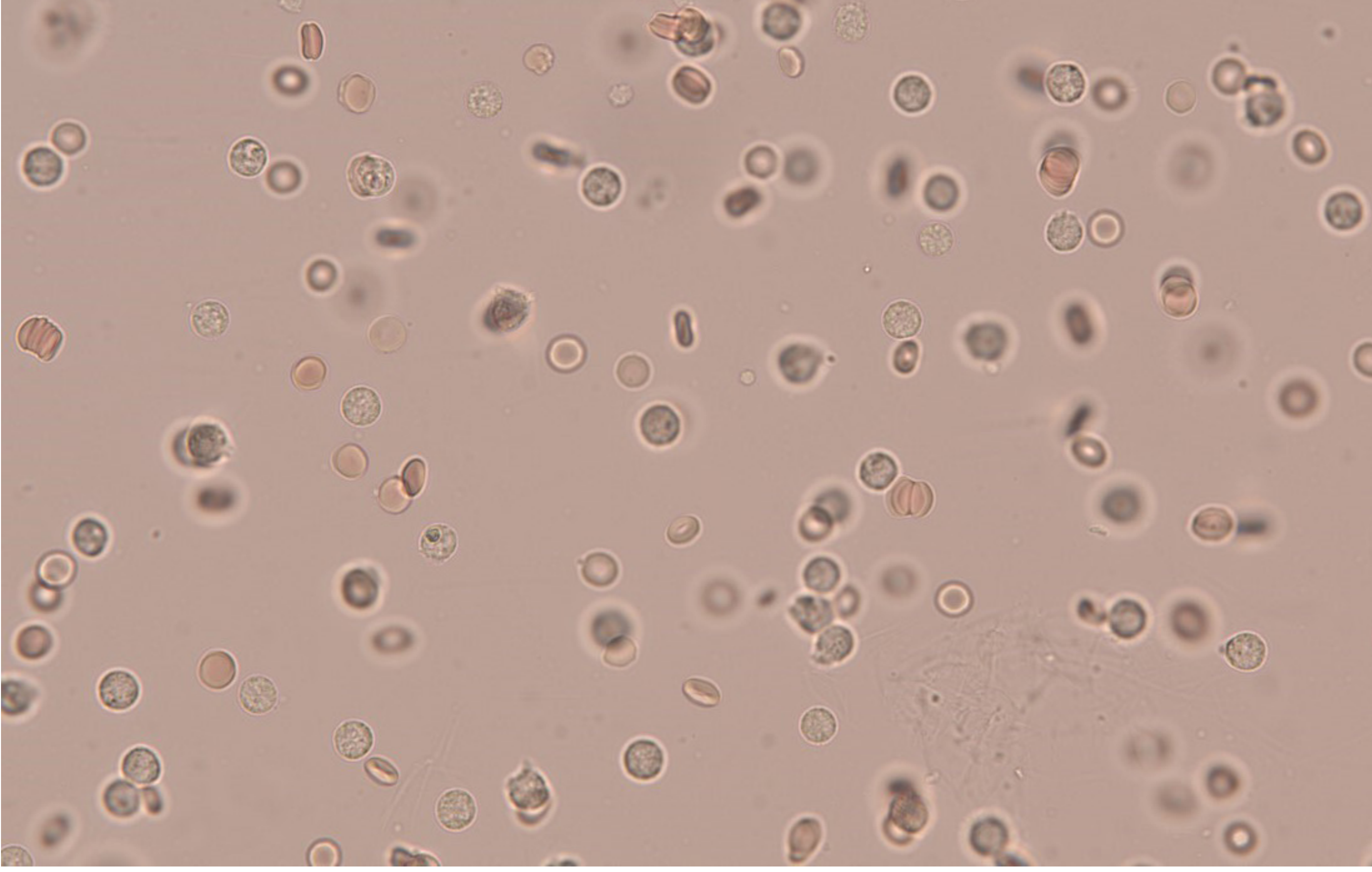
	+DMSO -80°C	+DMSO RT	-DMSO -80°C	DMSO RT
Number (%)	6 (11.1%)	12 (22.2%)	7 (13.0%)	7 (13.0%)
Pearson Chi-Square (Asymptotic Significance [2-sided]) p=.358				

### Presence of Clumping

	+DMSO -80°C	+DMSO RT	-DMSO -80°C	DMSO RT
Number (%)	10 (18.5%)	15 (27.8%)	7 (13.0%)	11 (20.4%)
Pearson Chi-Square (Asymptotic Significance [2-sided]) p=.283				

## Conclusions

- Preservation of synovial fluid with DMSO at -80°C seems to be helpful for maintaining cellular morphology.
- No significant differences between groups for artefacts and clumping; thus, no adverse effect from DMSO.
- Further assessments are in progress.



Photomicrograph (x40 objective) of SF with Grade 1 (fresh appearance) cellular morphology.

