

Dynamic Videomicroscopy Evaluation of Synovial Fluid in Gout

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Synovial fluid examination plays a key role in diagnosis of crystal related arthropathies. The presence of urate crystals in an affected joint should be interpreted as confirmatory of the diagnosis of gout^{1,2}. Needle shaped urate crystals are usually identified by examination under polarized light microscopy at the maximum magnification of 400×, showing a strong negative birefringence³.

Recent progress in computer vision techniques provided an opportunity to highlight the innovative applications of high magnification digital videomicroscopy for the study of synovial fluid in gouty patients, without polarized light⁴. This system comprises an optical microscope (Lab 16, Leitz), adapted with a special objective for 3000× magnification, a digital video camera (SSC DC38, Sony), a color video monitor (S-VHS SVTS 3000, Sony) that makes adjustment of the image possible, and a digital recorder (Digital Still Recorder DKR 700P, Sony).

High magnification digital videomicroscopy allows quick identification of both intracellular and extracellular monosodium urate crystals and accurate assessment of all the steps of the interaction between monosodium urate crystal and polymorphonuclear leukocytes, from the first contact (Figure 1, A and B) to the complete phagocytosis (Figure 1, C to F). The entire process occurs in about 60 seconds. These photographs indicate that high magnification digital videomicroscopy is a useful tool for both static and dynamic assessment of synovial fluid in gout.

REFERENCES

1. McCarty DJ. Crystal identification in human synovial fluids. *Rheum Dis Clin N Am* 1988;14:253-67.
2. Gordon C, Swan A, Dieppe PA. Detection of crystals in synovial fluids by light microscopy: sensitivity and reliability. *Ann Rheum Dis* 1989;48:737-42.
3. Schumacher HR Jr, Reginato AJ. Atlas of synovial fluid analysis and crystal identification. Philadelphia: Lea & Febiger; 1991.
4. De Angelis R, Bastianelli P, Biondi L, Muti S, Grassi W, Cervini C. La videomicroscopia digitale ad alta risoluzione nello studio del liquido sinoviale nella gotta. *Il Reumatologo* 1997;18:122-3.

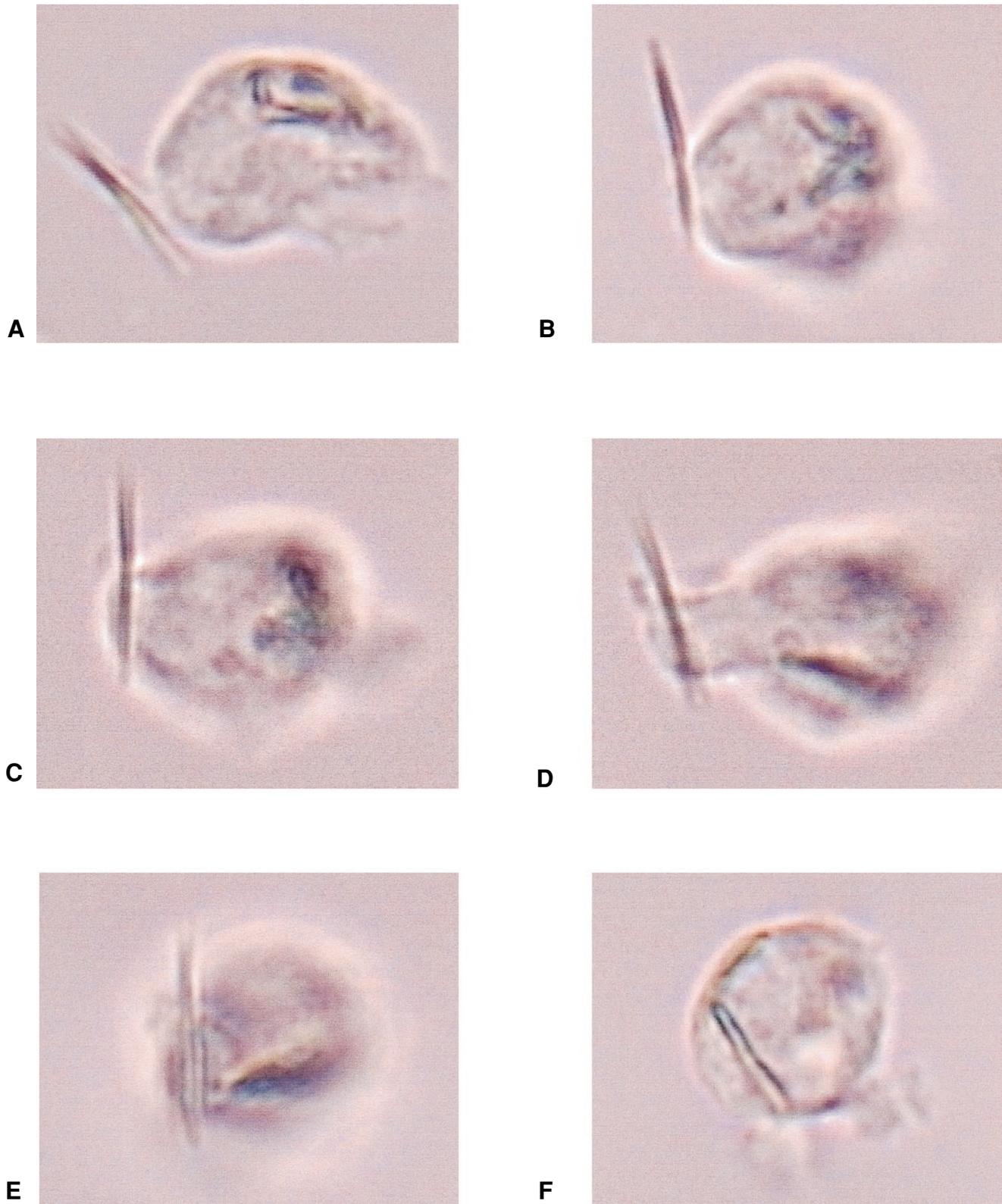


Figure 1. High resolution videomicroscopy (3000 \times). A. A polymorphonuclear leukocyte approaches an extracellular monosodium urate crystal. B. Contact between crystal and leukocyte. C. First phase of phagocytosis. D, E. Phagocytosis in progress. F. Complete phagocytosis of the monosodium urate crystal.