



# The Persistency and Visibility of Synovial Fluid Crystals After at Least 10 Days in Refrigerator by Light and Polarized Microscopy

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## Abstract

**Introduction** Synovial fluid (SF) analysis is one of the most important tests used in approach to arthritis and is necessary for rheumatology fellowship training. It depends on the operator's experience and can be affected by handling, processing, temperature, type of preservative, and time from aspiration to analysis. Therefore, we aimed to reevaluate the SF with positive results for crystals, after at least 10 days for the persistency and visibility of the crystals.

**Method** For 1 year, we reevaluated crystal positive synovial fluid samples after at least 10 days under light and polarized microscopy. The samples were sent in tubes without any preservative. After the first day of diagnosis of a crystal arthropathy, all the samples were kept in 4 °C refrigerator in a syringe without any preservative and then reevaluated.

**Results** 14 calcium pyrophosphate (CPP); 12 monosodium urate (MSU), 1 of which was combined CPP and MSU; and 1 post-methylprednisolone (Depomedrol) injection, steroid crystal arthropathy were found and reevaluated. In all reevaluated samples [between 10–24 (median: 14 days)], the crystals were detectable again.

**Conclusion** Our results suggests that SF CPP, MSU and methylprednisolone crystals at 4 °C without preservation could be detectable after 10–24 days (median: 14, 15.5, and 10 days, respectively) under light and polarized microscopy. It seems that the samples evaluated in emergency settings without enough time and those sent from other centers or gathering samples for trainees can be kept to detect crystals at least 10 days for all and till 22 days (for CCP and MSU) after sampling.

**Keywords** Crystal · CPP · MSU · Synovial fluid analysis · Polarized microscopy

## Introduction

Synovial fluid (SF) analysis is one of the most important tests in approach to arthritis. It determines the degree of inflammation, finding the pathologic crystals and microorganisms [1]. Therefore, the capability of SF analysis and diagnosis of the crystals under polarized microscopy is a requirement in rheumatology fellowship training [2, 3].

Synovial fluid analysis is operator dependent, and its interpretation depends on the experience and presence of specially trained personnel/trainees [4]. Moreover, it can be affected by its handling, i.e., processing method, temperature, type of preservative, and time from aspiration to analysis. SF specimen handling methods remain controversial.

The optimal recommendation is to examine the SF promptly, ideally immediately after aspiration, that is usually not applicable. In emergency room settings, where the focus is on infection evaluation, crystals sometimes can be missed due to restricted time for evaluation, and it is important to re-examine the SF for crystalline when an infection is excluded, maybe after 3–5 days. Sometime because of crowded clinics or lack of experienced clinicians or training or proper equipment in rural clinics and its time-consuming process of searching for crystals, the sample needs to be evaluated in equipped clinics. Also, we sometimes need to keep the samples for the best time when trainees are all available to learn the method of its interpretation in university clinics [5].

Therefore, we made an attempt to reevaluate the samples of SF with positive results for crystals after 10–14 days under polarized microscopy to find the time of the persistency of crystals when they were kept in refrigerator without any preservation.

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**Data availability** All data and materials in this article are available from the corresponding author on reasonable request.

## Declarations

**Conflict of interest** The authors have declared that they have no conflicts of interest.

**Ethics approval and consent to participate** The ethics committee of Shiraz University of Medical Sciences approved this study (Ethical code: IR.SUMS.MED.REC.1401.330). Patients' information was anonymized before data analysis and confidentiality of patient information was guaranteed and protected.

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