Fluoroscopy in the Removal of Deep Etonogestrel Implants

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Abstract
Fluoroscopy is an imaging technique that uses X-rays to obtain real-time moving images. Although described in the literature in several areas of medicine, the use of fluoroscopy in some specialties remains poorly explored. The two clinical cases described demonstrate a successful removal of deep etonogestrel radiopaque implants through the use of fluoroscopy proving to be a promising technique as an alternative or complementary to conventional techniques - X-ray and ultrasound. Fluoroscopy has a good safety profile with an easy learning curve, and its knowledge and use may contribute to the resolution of more complex cases of subcutaneous implant extraction.

Keywords
Fluoroscopy; Etonogestrel implants; Removal; Contraception.

Introduction
Contraceptive implantation is a long-term and very effective contraceptive method, being used worldwide.¹ It consists of a 4 cm long ethylene vinyl acetate rod, containing 68 mg of etonogestrel and 15 mg of barium sulphate; it should be placed on the inner side of the arm in the subdermis to allow for easy removal.

Since the beginning of contraceptive implant use, several cases of difficult localization and extraction have been described.² The latest implant - Implanon NXT, is designed to limit deep insertions by designing a new applicator. The addition of barium sulphate,³ making it radiopaque, has allowed an easier identification. However, although easily identified, its removal is still sometimes difficult and the range of options for its resolution scarce and occasionally ineffective.⁴ In this sense, the search and learning of new techniques becomes fundamental.

Fluoroscopy is an X-ray technique that enables to obtain real-time imaging. This technique, already widely studied,⁵ assists various diagnostic and therapeutic procedures in different areas of medicine. This method allows the visualization of sequential images using a low dose of time dependent radiation. Literature data regarding its use to support the removal of non-palpable implants are scarce,⁶ possibly being an advantage to incorporate this technique in deep implant removal protocols.

Clinical cases
Two cases are described involving radiopaque etonogestrel contraceptive implant removal at the Central Lisbon University Hospital (CHULC), using fluoroscopy.

Case 1: 26-year-old patient with no relevant personal history, who was referred to the CHULC Family Planning (FP) consultation for an unpalpable contraceptive implant (placed 39 months earlier at the Health Center) after unsuccessful extraction attempt in Primary Health Care with prior x-ray identification of the left arm (fig. 1). Ultrasound of soft tissue was performed at the Service and Radiology using a high frequency linear probe (10-14 MHz, GE) and after identification of the implant in subfascial location its projection on the skin was marked with a dermal pen and a new extraction attempt was made with no success. The patient was referred to the CHULC General Surgery consultation where two attempts of removal were made, both unsuccessfully.
One year later the patient returns to the FP consultation due to the desire to get pregnant, being for about 6 months without additional contraception. After discussing the case with the radiology service, extraction was programmed using fluoroscopy (Fig. 3), where, under real-time visualization, the extraction of the implant was performed.

**Case 2:** A 35-year-old patient with a known history of medicated and controlled asthma, referred to the FP consultation for non-palpable implant extraction, placed 44 months ago at the Health Center. Initially, an X-ray to the arm was performed to confirm the presence of an implant in the arm. Then, soft tissue ultrasound was requested for dermal pen localization and marking, with attempt to extraction but without any success.

The soft tissue ultrasound identified the implant in deep, subfascial and triceps level and given the previous success with fluoroscopy, this technique was again chosen resulting in the implant extraction.

**Discussion**

Etonogestrel implantation is a highly effective and long-lasting contraceptive method, being this the choice of many women. It should be inserted subdermally with local anesthesia in the inner face of the non-dominant arm. Training in its introduction and removal is recommended by leading national and international societies, knowing that a correct insertion will facilitate its extraction. However, despite a progressive improvement in results, in about 0.1% of cases, the extraction of implants becomes complex. Given the low frequency of these deep removal situations, it is important to refer these cases to Reference Centers of deep implant extraction. These should include a multidisciplinary team of Specialists with knowledge on anatomy and with upper limb surgery experience, including Plastic Surgeons, Orthopedists and Radiologists.

In this sense, the existence of different auxiliary methods to allow the extraction with success is essential. Among the imaging exams used, the best known and those presenting the best results are the X-ray (only possible after the entry in the market of the latest radiopaque implant in Portugal since 2010), which allows the identification of the implant and the soft tissue ultrasound helps in its localization. However, the continuous description of unsuccessful cases in the extraction of non-palpable implants makes the search for alternative techniques necessary. Fluoroscopy is thus presented as another imaging support option in solving difficulties in cases of extracting non-palpable implants, given the radiopaque characteristics of this contraceptive. Therefore, training and learning this technique by the specialties that implement these image-guided procedures as a routine is important.

**References**


