

# Use of cyanoacrylate accelerator in the fixation of flexible plastic blade for the treatment of transverse hypercurvature of the nail

*Uso do acelerador de cianoacrilato na fixação de lâmina plástica flexível para o tratamento da hipercurvatura transversa da unha*

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## ABSTRACT

Transverse hypercurvature is a deformity of the nail plate, unaesthetic and painful, causing discomfort to the patient. Treatment can be conservative or surgical. Related to the conservative treatments, placing the flexible plastic blade on the nail plate using cyanoacrylate glue, promotes rapid improvement of pain and its widening from three to six months. The use of cyanoacrylate accelerator facilitates the procedure, making it faster.

**Keywords:** nails, malformed; nails, ingrown; nail diseases; ambulatory surgical procedures

## RESUMO

*A hipercurvatura transversa é deformidade da placa ungueal, inestética e dolorosa, provocando desconforto ao paciente. O tratamento pode ser conservador ou cirúrgico. Dos conservadores a colocação da lâmina plástica de memória sobre a placa ungueal, utilizando cola de cianoacrilato, promove rápida melhora da dor e seu alargamento entre três e seis meses. O uso de acelerador de cianoacrilato facilita o procedimento tornando-o mais rápido.*

**Palavras-chave:** unhas malformadas; unhas encravadas; doenças da unha; procedimentos cirúrgicos ambulatorios

## INTRODUCTION

Transverse hypercurvature of the nail is a deformity is characterized by an increase in the curvature of the nail plate.<sup>1-3</sup> It can be classified into three types: pincer nail, tile nail and folded nail. In the pincer nail, there is a longitudinal increase in the curvature, which intensifies in more distal portions of the nail's longitudinal axis. In the tile nail, the curvature remains unchanged along the longitudinal axis; while in the folded nail there is an abrupt angle in one or both lateral margins.<sup>1,2</sup> The hypercurvature of the nail can be hereditary or acquired. The hereditary form is symmetrical and occurs in many family members. In addition to the halluces, other fingers can be affected. It is linked to the misalignment of the phalanges, in a way that the halluces are deflected laterally, while the other fingers are deflected medially.<sup>1,2</sup> The acquired form tends to be limited to

the halluces and is generally not symmetric, relating to various conditions, such as foot deformity caused by poorly adapted footwear; degeneration of the distal interphalangeal joint (more common in older women); trauma, such as repeated unguis exeresis; tumors of the nail apparatus (exostosis, epidermal cyst, myxoid pseudocyst) and inflammatory onychopathies such as psoriasis.<sup>1-3</sup>

Some articles relate the hypercurvature etiology with the selective widening of the phalanx's base caused by juxta articular osteophytes that are closely linked to the nail matrix by collagen fiber ligaments.<sup>1,3</sup>

It is a painful and uncomfortable condition that interferes with the patient's quality of life.<sup>1-3</sup> Treatment can be either surgical or conservative. Examples of conservative techniques are: taping of the lateral folds, nail abrasion, use of plastic tubes and metal or plastic braces fixed on the nail plate. Plastic orthoses (clip system) relieve pain in a few weeks and widen the nail, reducing the hypercurvature within six months, and are mostly indicated in cases of pincer nails. Despite being considered an easy to perform technique, the fixation of plastic devices onto the nail plate can be difficult, especially in cases where the hypercurvature is more pronounced. The authors suggest the use of the cyanoacrylate accelerator in order to facilitate the procedure, reducing the time of implementation.

**TECHNIQUE**

The authors use the clip system (LUGA®, Spain) consisting of an elliptical semi-rigid, flexible shape-memory polyurethane sheet, available in sizes from 16 to 26mm.

The nail plate is initially sanded on its surface and degreased with acetone in order to increase the plastic sheet's adherence.

The sheet is then molded in its longer axis so that fits transversely on the nail plate, in its medial-distal portion, maintaining a distance of 1mm from the lateral folds. One of its faces is also lightly sanded aiming at increasing adherence to the nail plate.

A thin layer of cyanoacrylate glue is placed on the plastic sheet with the aid of a toothpick (Figure 1). In the described technique, the cyanoacrylate accelerator (ZAP®, PACER TECHNOLOGY, Rancho Cucamonga, USA) (Figure 2)



**FIGURE 1:** Application of a thin layer of cyanoacrylate glue on the plastic sheet with the aid of wooden toothpick



**FIGURE 2:** ZAP® brand cyanoacrylate accelerator used in the technique



**FIGURE 3:** The cyanoacrylate accelerator is placed in a plastic container

is poured into a plastic container (Figure 3). The plastic sheet is attached to the nail plate with the aid of the operating physician's fingers, exerting slight pressure. The cyanoacrylate accelerator, soaked in a wooden toothpick, is placed on the sides of the orthosis using the other hand (Figure 4). By capillarity, the accelerator comes into contact with the glue and immediately fixes the orthosis to the nail plate (Figure 5).

The plastic sheet should be replaced every 30 or 60 days.<sup>1</sup>

**DISCUSSION**

Transverse hypercurvature is a nail deformity that is prevalent in the population. Treatment is indicated for situations where there is aesthetic discomfort or pain.<sup>1-4</sup> The most commonly used conservative treatment is the application of plastic sheets due to its safety, efficacy and low cost.

The orthosis exerts light and constant pressure, flattening the nail plate and reducing its pressure against the lateral folds.



**FIGURE 4:** The plastic sheet is attached using the operating physician's fingers, while the accelerator is applied to the sides of the orthosis with the aid of a toothpick



**FIGURA 5:** Final result with the plastic sheet fully adhered, especially on the lateral portions, where the hypercurvature is more intense

The plastic sheet is tough and little pliable, making its fixation difficult, especially at the lateral borders, where the hypercurvature is more pronounced.

The use of the cyanoacrylate accelerator facilitates the placement of the orthosis, as it increases the cyanoacrylate glue's bonding speed and filling capacity.<sup>5</sup>

The cyanoacrylate glue has ethyl cyanoacrylate, methyl methacrylate and hydroquinone in its composition, while the accelerator is composed of dimethyl-p-toluidine (DMT), hydrocarbon propellant and VMP naphtha. Although these products are considered sensitizers, the rapid polymerization and immediate adhesion to the nail plate's keratin prevent their penetration in the epidermis and contact with the antigen presenting cells.<sup>6</sup> In this way, the patient's possibility of developing an allergic con-

tact dermatitis (ACD) is unlikely. The physician who performs this procedure is at increased risk of developing ACD, meaning he or she should make use of personal protective equipment.

There are reports of ACD by DMT, which is also present in the orthopedic cement accelerator and dental acrylic cement, where sensitization is greater in workers using industrial adhesives, surgeons and dentists, due to the frequent contact with this substance.<sup>7</sup>

#### CONCLUSION

The cyanoacrylate glue accelerator is a useful and cost effective tool, allowing a more rapid and effective placement of the orthosis. ●

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