

## Existing products analysis

Although it is true that the research results obtained so far are the basic starting point for some project concept sketches, the existing products analysis comes to support, enlarge or contradict what is already accounted for. The strengths and weaknesses of the products already in the market (and therefore constantly being tested in the real world) are the target of this analysis in order to inform the design criteria.

The analysis goes through three stages. First, two different types of exam tables classified in terms of their design aims, are analyzed. The objective of this stage is to evaluate the trinomial quality-functionality-technology and to assess competitive products for the proposed PET. The second stage focuses on successful equipment specifically designed for children to learn from its intelligent design and ponder the use of plastic as a possible material. Finally, the third stage considers the use of plastic inside the healthcare field, particularly looking for a piece of equipment supporting the eventual choice of plastic as the material for the PET.

Cost is evaluated in every case as a major concern brought up during the ethnographic research.

### High-Quality, High-Technology, Functional, Universally-designed powered exam tables

The majority of the exam tables found in the exam rooms **are manufactured by very well known companies** such as Midmark/Ritter or Hill-Rom. These are high-quality products aiming at perfect functionality and flexibility of use. In terms of their form and mechanics, being all very similar, two types can be differentiated. The first type have an adjustable upholstered backrest and a base with storage drawers, usually made of steel with a powder coated paint finish. The second type are conceived as a dentist chair with all the smooth movements possibly imagined and considerably nourish the project.

Briefly described, these powered exam tables have their upholstered headpiece, backrest, seat and feet piece completely articulated mounted on a central stand, which houses the electric mechanism. **Their design responds to the physician and patient's ergonomics and perfectly meets their physical needs, based on the concept that the exam table is a table as much as it is a chair.** The patient can sit with his feet on the floor while he talks with the physician, or if necessary, the physician can elevate the patient to a lying position at an adequate height for the medical procedure. Between these two, all the intermediate positions are possible

through accurate electro-mechanic features and even electronic commands. Thus, **in terms of the quality-functionality-technology trinomial, their high quality goes along with their high functionality, achieved using the highest technology.**

To inform this pre-design analysis in particular, it is important to point out that in the technical brochures the manufacturers proudly state that **these functional examination tables are universally designed. In other words, they are designed for disabled, elderly, pregnant and pediatric patients.** So an exclusively pediatric model in particular is not considered, because these models perfectly satisfy the pediatric exam's functional needs. In fact when a company like Midmark specifies pediatric equipment in its line, it refers to baby stations dimensioned to hold infants, with a built-in digital scale and a measurement arm usually for neonatal intensive care.

Unfortunately for many pediatricians, the price of these powered exam tables ranges from two thousand to ten thousand dollars.



**“Child-friendly” pediatric exam tables**

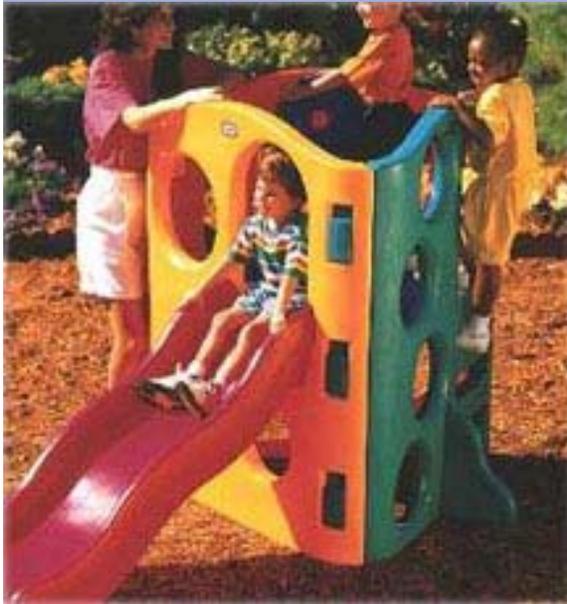
Child-friendly exam tables (or beds) are not widely used or known and their design doesn’t correspond to the concept built upon the design criteria deduced from previous research. But, as **“Child-friendly” is a term manufacturers use to refer to pediatric equipment** they would probably be market competitors of this thesis’ PET.

Children see these beds like belonging to their world certainly easier than they can see the typical examination tables with dull cushioned vinyl cover on four painted steel or wooden legs. **However, although they are colorful and attractive, their form and functionality don’t differ significantly from those of a typical exam table.** For instance, they are shaped like an animal or a vehicle, made of colorful high-pressure laminate or fiberglass. Still, they have in general a storage base, which can be inscribed into a prism, and where the medical materials are at the children’s reach compromising their safety. Their “comfort formed pad” is still a cushioned vinyl surface that deteriorates fast and they are difficult to climb even with the help of built-in steps. They have basically been designed like regular exam tables and then dressed up to look “child-friendly”. Besides, the fact of being figurative, representing for instance a train or a dinosaur may result in becoming inappropriate for the oldest pediatric patients. The pediatric patients’ age ranges from infants to teenagers, and whether toddlers or children may enjoy riding on a dinosaur teenagers may surely not.

Another argument preventing their success is that pediatricians seldom prefer the child-friendly exam beds upon the conventional ones because the additional features are not worth the cost.

Girl sitting on the Midmark/Ritter 222 Universal powered exam table  
Midmark 411 Power Examination Table: chair and flat positions

Goodtime Medical: Purple engine and Train pediatric tables  
Zoopals: Dinosaur and Elephant exam tables



### Successful playing structures made of plastic

At this stage of the analysis, the goal is to nourish the design concept for the PET regarding the critical fact that the exam table must be designed for children. The best approach to assess the design possibilities is to take distance from the healthcare equipment and consider the products especially designed for the children. The challenge here is identify the successful products that could support and enrich the established design criteria. Then, among the thousands of products that children enjoy everyday, the plastic playing structures seem to be the most interesting option (for example the ones manufactured by Little Tikes, a Newel/Rubbermaid company).

**These colorful plastic forms are made to climb on, to sit on, or even lie down on. Many models are dimensionally comparable to an examination table. They are exclusively designed for the children; so each one of its details contemplates children's anthropometrics and safety at the same time.** For instance to reduce trip hazards each step is at the child's scale and all sharp corners or protrusions are eliminated. These attractive playing structures are not only cautiously and precisely designed but also allow their users to feel at ease. Their flexible design makes them easy to assemble

and to transform, and the fact that they are made of plastic contributes to their design success.

Due to the material itself (Little Tikes uses polyethylene for most of its parts) and its manufacturing process, **plastic allows almost any color and shape. Furthermore, it meets the functional needs associated with children including durability and easy cleaning. In addition plastic contemplates sensorial needs such as hardness, surface texture and temperature.** It is fairly soft and warm for children to touch and to sit or lie down on, yet it is hard enough and has already an attractive texture to discourage them from trying to punch, tear or scratch it.

Last, the component parts of these plastic structures are produced at a very reasonable cost. They are light and can be disassembled to reduce shipping, handling and storage costs. The retail price for Little Tikes' models of children plastic furniture or household playing structures ranges from fifty to three hundred dollars.

### The use of plastic in healthcare equipment: the example of a cardiology emergency cart

In this last step, the search for existing products comes back to the healthcare field to confirm that

Little Tikes' playing structures:  
Wave Climber  
8 in 1 Adjustable Playgroup  
Easy adjust play table

plastic is far from being a new material in the healthcare field. In fact it is so broadly accepted that it involves catheters to storage systems. However, as the purpose of the analysis here is to ponder plastic as an alternative material for the proposed PET, the search must be framed.

To demonstrate how plastic can be an alternative material for medical equipment without compromising its functionality, the most illustrative reference found is the Lifeline emergency cardiology cart. As part of the Metro Healthcare line, (which deals with high-density plastic storage systems and utility carts as well as medical carts) the Metro Lifeline emergency cardiology cart illustrates how plastic is perfectly valid even in the case of equipment designed for very precise procedures. It is designed with the functionality and flexibility of use needed for any emergency cart. Beyond this, the alternative of making its case out of plastic gives to this particular cart other advantages. **The cardiology cart is not only easy to clean and durable enough to serve its precise function, it is also comparatively light. Due to its bright color it can be immediately seen in the clinical environment where stainless steel and gray laminate are dominant. It is therefore more practical than other competitive products because it is faster to find and lighter to**

**transport, contributing to speed the medical procedure, a critical issue in cardiology emergency situations.**

Looking at its retail price, which is less than nine hundred dollars, it is a good example of a specific functional piece of equipment available at an affordable price.

In like manner, using plastic in the proposed PET helps in responding to children's emotional needs and pediatricians' expectations. Plastic allows precisely meeting the pediatric examination procedure's medical functional needs, introducing at the same time visual and tactile considerations into the design criteria.



Metro Lifeline cardiology cart

## Design concept concerns

At this point before entering into the PET design proposal, it is useful to visualize the pre-design research process in general.

Preliminary ideas suggested that apart from the defining elements inherent to its function, the proposed PET should incorporate to its design some characteristic elements of the children's world. The references showed that it is not only possible but also desirable to intelligently incorporate these elements to a design specifically addressed to children. The ethnographic research allowed establishing the design criteria because it precisely revealed both of the inherent elements of the PET: the ones concerned to perform its specific function and the ones characteristic to the children's world. Finally, the existing products analysis clarified the design concept as follows:

- For every functional exam table, and a pediatric one in particular, both physician and patient's ergonomics are to be considered.
- At least two patient's positions must be contemplated: lying down and sitting down.
- Concerning the thesis objective, the goal is to achieve a low technology cost-effective product. The existing high-technology powered exam tables are excellent and meet the selected criteria, but a sophisticated technology is not essential for a routine pediatric exam.
- The pediatric design concept goes far beyond a figurative shape.
- Plastic is the material chosen for the proposed PET, opening new design possibilities that account not only for aesthetic appeal but also for the functional requirements associated to healthcare and to children.