Abstract

X-ray therapy has been an important treatment option in dermatologists’ offices for nearly 100 years. Recently, there has been a revival of interest in both superficial X-ray therapy and grenz ray therapy. This chapter will guide the physician through each step of starting a radiation therapy unit in the office and review the approximate costs.

X-ray therapy has been an important treatment option in dermatologists’ offices for almost 100 years. However, during the 1980s there was a dramatic decline of X-ray use in our field. This may have occurred as a result of the poor publicity of radiation or the decrease of teaching in resident training programs [1]. Recently, there has been a revival of interest in both superficial X-ray therapy and grenz ray therapy. This chapter will guide the physician through each step of starting a radiation therapy unit in the office and review the approximate costs.

The most important step is learning the proper techniques of X-ray treatment. If your training did not include radiation therapy, several avenues are available. The easiest is to find a physician close by and try to spend some time in their office. One day or even a half-day each week for several months is the best introduction [2]. If you are unable to locate a physician practicing radiation therapy, contact the International Dermatology Radiotherapy Society (IDRS) at www.IDRS.net. They will be able to give you the names of several physicians in your area or nearby. Furthermore, you can receive information regarding institutions that have a dermatology–radiotherapy teaching program. Reading is extremely important. A thorough understanding of radiation physics is mandatory. When you’re ready, the IDRS offers a radiation-certifying exam for dermatologists.

The superficial radiation treatment equipment that a dermatologist needs has a kilovoltage peak (kVp) of 150 or less [3]. Therefore, the amount of lead lining needed to protect from the direct beam is 1/16 of an inch. For scatter, the amount of thickness is half that of the direct beam, which would be 1/32 of an inch [4]. However, lead cut to that thickness is rare, more expensive and as a result, not used. The only area in the treatment room that gets direct beam is usually the floor. A typical building floor has a concrete layer of 3–4 in. Furthermore, you must also know who and what is under your floor. For example, if your office is on the ground floor and only a garage or basement is underneath, no lead lining on the floor is needed. If an office is below, you may be able to get away with just lead lining the examination table; the rest of the floor would then be receiving only scatter. You and your radiation physicist can best decide this depending on scatter measurements. In addition, you must also know who and what is above you. The ceiling only receives scatter, and therefore the concrete above is usually enough protection. Your walls are mostly made of sheet rock. These will need to be lead-lined if the adjacent rooms are examination rooms. In the United States, federal law dictates that the lining should be 7 ft high. Special lead-lined sheet rock can be purchased to build your room or lead sheets can be put over your existing
walls. Several companies can supply this and their names can be found in the yellow pages, on the Internet, or by contacting the IDRS in your area.

Choose the right placement of your X-ray treatment room. Most dermatologists who practice radiotherapy use their X-ray treatment rooms as an additional examination room. You should still be able to see and treat patients in this room even when the patient is not there for radiation treatment. In addition, you want to avoid lead lining the entire room, which can be very costly. The room’s layout should be such that when the unit is delivering X-ray, the surrounding area/rooms are less populated. This ensures the least amount of radiation scatter to those persons nearby. Remember, we treat with superficial X-ray. Therefore, a good choice is an area with one or more walls facing outside. If the outdoor space is limited to no or very little human traffic, you will not have to lead line that particular wall. In addition, a wall adjacent to a bathroom further decreases the number of people likely to be exposed to scatter. However, most radiotherapy treatment rooms will need some lead lining. In the United States, the federal laws dictate how the surrounding rooms should be protected from radiation scatter. Individual states rarely have more strict rules. It is recommended to check with your individual local laws through the state board of health. Remember, the law does not dictate the thickness or type of lining needed. The law is to protect the nonradiation worker from exposure. A radiation physicist must measure the amount of X-ray leakage at the maximum workload in the treatment and surrounding areas. Only then, will you be able to determine which walls, floors, and ceilings to lead line [5].

A radiation physicist must calibrate each X-ray unit annually [6]. The cost varies in each area. The cost in New York City is about $350 for each unit. During this time, your physicist can check the scatter to the surrounding areas. The name of a physicist close to you can usually be found by contacting the radiology department of your local hospital.

If you want to set your office up for grenz ray therapy, the task is quite simple. If you use a maximum of 20 kV, no special lead shielding is required. Again, a complete understanding of the radiation physics involved is of greatest importance. Minimal scatter is achieved 2–3 ft away from the indirect beam. Furthermore, most clothing shields the penetration of grenz ray scatter. Simply standing across the room with your back to the treatment area theoretically yields adequate shielding. During treatments, only you and the patient should be in the room [7, 8].

The approximate costs of lead lining for an 8×10-ft treatment room is as follows:

- Applying sheet lead to bare wall studs before they are covered. Using lead 1/16 of an inch thick installed at approximately US $8 per square foot. This is then covered by standard sheet rock.
  - Room cost with this method $2,016.
  - Room with leaded sheet rock installed $2,300.
- Lead line ceiling of room with 1/16 of an inch lead, $910.
  - Ceiling finish (hung ceiling, sheet rock, etc.) priced by the type of ceiling.
- Lead lining of the floor with 1/16 of an inch lead, $640
  - Covering of lead would be a separate cost depending on the materials used (rug, wood, tile, etc.)
- Lead door with observation glass, $670
- Lead safety shielding (eyes, target area, etc), $300

These prices will vary depending on the location and working conditions.

The most costly step is acquiring the superficial X-ray equipment. All radiation therapy has become archaic in the eyes of many young dermatologists and as a result has gone into disuse. Thus, most manufacturers no longer cater to the needs of the dermatologist. The only new equipment seems to be made for radiotherapy institutions. The typical price for a superficial X-ray unit is about $100,000. Pantak, a subdivision of AGFA, makes the Therapax 150 Therapeutic X-Ray System (AGFA). The cost is about $99,000. Adding the tax cost, it is well over $100,000. The equipment may