Breast cancer is the most commonly diagnosed cancer in women in the United States; in 2003, an estimated 211,300 new cases will be diagnosed (Jemal et al., 2003). Early-stage breast cancer (i.e., stage I or II) is treated with breast irradiation (i.e., breast-conserving therapy) or mastectomy. Large randomized clinical trials have shown that mastectomy is an equivalent treatment option to lumpectomy and radiation therapy (Arriagada, Le, Richard, & Contesso, 1996; Fisher et al., 2002; Jacobson et al., 1995; van Dongen et al., 2000; Veronesi et al., 2002). Patients also undergo a sentinel lymph node biopsy (SLNB) and/or an axillary lymph node dissection (ALND) to determine the extent of the disease.

Adjuvant systemic treatment may be indicated if patients have unfavorable pathologic features (e.g., a tumor larger than 1 cm, lymphovascular invasion, lymph node involvement, high nuclear grade and/or histologic grade, Her2-neu overexpression, hormone receptor negative status). Systemic therapy may include chemotherapy and/or hormonal therapy. Patients who are estrogen and/or progesterone receptor positive may be considered for adjuvant hormonal therapy initiated during or after the completion of radiation therapy (National Comprehensive Cancer Network, 2002).

Before the start of radiation ensures correct dose distribution of radiation to the target area and minimal exposure to surrounding normal structures (i.e., heart, lung, ribs). In patients who do not require adjuvant chemotherapy, radiation therapy typically begins three to four weeks after surgery. This allows for adequate healing of the lumpectomy incision site. On occasion, wound dehiscence, maceration, postoperative infection, or hematoma formation may delay the initiation of radiation. Otherwise, radiation is started one month after the last cycle of chemotherapy.

Traditionally, a patient is treated in a supine position with the arm on the affected side elevated above the head to ensure that the arm is out of the treatment field. An immobilization device is made to ensure reproducibility of the treatment position each day (see Figure 1). Radiation is administered to the entire breast using photon beams aimed in opposing tangential fields. The breast is irradiated with a dose of 180–200 cGy, Monday through Friday.