Clinical experiences and studies have shown that patients with tumors often experience multiple concurrent symptoms during their disease trajectories. However, the majority of symptom research focuses on single symptoms. Dodd, Miaskowski, and Paul (2001) studied symptom clusters and suggested that research should focus on evaluating associations among multiple symptoms and the possible synergistic adverse effects on patients’ future morbidity. The concept has continued to be discussed in scientific contexts (Dodd, Miaskowski, & Lee, 2004; Dong et al., 2016; Fox, Lyon, & Farace, 2007; Kim, McGuire, Tulman, & Barsevick, 2005; Miaskowski, Dodd, & Lee, 2004; Xiao, 2010). Symptom clusters refer to stable groups of symptoms that are relatively independent of other symptom clusters (Kim et al., 2005). Fatigue, insomnia, pain, and depression constitute the most prevalent symptom cluster in cancer (Barsevick, 2007). There are several nursing theories and models of symptom experience and management (Brant, Beck, & Miaskowski, 2010). Most symptom management models assume that the healthcare provider will only focus on one symptom at a time. However, an exception is the theory of unpleasant symptoms (TUS) developed by Lenz, Pugh, Milligan, Gift, and Suppe (1997). This theory postulates that symptoms co-occur and do not exist in isolation. Therefore, the TUS provides a good basis for research regarding symptom clusters.

Proton beam therapy (PBT) is a radiation therapy modality in which proton particles penetrate deep into the target and stop at a certain depth, depending on their energy (Durante & Loeffler, 2010). With PBT, the risk of damage to healthy tissues is potentially reduced. In addition, the dose targeted at the tumor may be increased in some cases, meaning control over the tumor is potentially increased (Schulz-Ertner & Tsujii, 2007). PBT may also have fewer medical side effects than