Chapter 6

Concluding remarks

Prior to 1980, the medical information that is the most common cause of CP is hypoxic-ischemic encephalopathy at birth[1], but at present, the most common cause of CP is premature labor and problems in the prenatal period.[2] There is not the best way to treat CP, as well as age to start treatment, and duration of treatment.[3] However, one of the treatment goals is to ensure that patients can ambulate and take care of themselves independently.[4] For decades, the direct goal of medical care for motor disabilities was to reduce the motor related-impairments such as spasticity and muscle contracture in order to enhance functional capacity.[5] However, the conceptual models of disability (ICF model)[6] have moved the essential concentration of therapeutic to the level of activity and participation of the individual patient. Most parents of children with CP dependably need to know its seriousness and whether their children will ever walk. Prediction about walking in children with CP have difficulty because many factors affect the status of walking during the growth of the child. However, an identification of predictors for ambulation is the most important in order to assist appropriate plan of intervention.[7, 8] Especially when the prognosis capacity on the walking tends to poor, appropriate treatment planning is the most effective way to prevent the loss of ambulatory capacity.[9]

The factors to predict ambulation for children with CP have been informed for decades by Sala and Grant.[10] They are divided into three main groups: 1) primitive reflexes and postural reactions; 2) gross motor skills; and 3) type of CP. In addition to these factors, other factors (e.g., epilepsy, intellectual disability, visual impairment, and hearing impairment) have been considered in several studies.[7, 8, 11-19] The studies from this thesis found that the prognostic predictors for ambulation among Thai children with CP were types of CP (spastic diplegia, spastic hemiplegia, dyskinesia, ataxia, hypotonia, and mixed type compared to spastic quadriplegia), sitting independently at age 2 years, and eating independently.[20] Additionally, the results from meta-analysis confirmed that sitting independently at the age of two years, absence of visual impairment, absence of intellectual disability, and absence of epilepsy or seizure are strong positive predictors for ambulation.[21] Other prognostic predictors from qualitative synthesis including type of CP,[8, 12, 14, 20, 22-25] primitive reflexes and postural reactions,[12, 22, 26] gestational age,[11, 14, 22, 23, 25] birth weight,[11, 14, 23, 25] gender,[8, 25] ability to feed self,[8, 20] hand function,[8, 20] expressive language,[8, 20] maternal ethnicity,[8, 11] antibiotic use,[11] Apgar score,[25] hyperbilirubinemia,[11] hearing impairment,[14] body mass index,[20] postural control,[27] reciprocal lower limb movement,[27] microcephaly,[22] and magnetic resonance imaging abnormality,[25] these

prognostic predictors were not statistically significant or were not pooled estimates in meta-analysis.

Bleck[26] has also established a scoring system in the year 1975 to predict ambulatory children with CP aged 1 year or more, which is the problem of delay primary walk. This scoring system has seven reflexes as predictors. However, a recent study in Japan[28] is about Bleck's scoring system to examine the difference of this score between the walking group and the non-walking group in children with spastic quadriplegia CP. This study showed that there was no significant difference in Bleck's scores between two this groups. It shows that the study does not support the Bleck' study possibility that he using predictor of a clinical predictor reflexes only, which also has other clinical predictor affecting walking prognosis. A large retrospective study conducted by Wu et al.[8] created a simple tool for predicting the probability of ambulatory outcome from various levels in children with CP aged 2 to 14. This tool was divided into four ambulatory charts according to gross motor function achieved at age two. Additionally, there were also prognostic tools of gross motor function.[29, 30] The gross motor function curves among the 5-level GMFCS were constructed to inform regarding the prognosis of children with CP at the age. In Thailand, Keeratisiroj et al.[31] created a simple ambulatory score chart among children with CP aged 2 to 18 for clinicians and therapists, which is based on the operational definition outcome from GMFCS. It was constructed using routine data including age, type of CP, sitting independently at age two, and eating independently. The ambulatory status was classified into three levels according to their GMFCS and total score: independent ambulation, assisted ambulation, and non-ambulation. The ambulatory score chart explained 93.91% non-ambulation probability and 92.05% independent ambulation probability, as the area under the ROC curve. This prognostic tool is different from the previous tools in both outcome and predictors, including techniques and applications.

In conclusion, the result of this thesis suggested that the prognostic predictors for ambulation were type of CP (spastic diplegia, spastic hemiplegia, dyskinesia, ataxia, hypotonia, and mixed type), sitting independently at age 2 years, and eating independently for Thai children with CP aged 2 to 18. These indicators were utilized to create ambulatory score chart for anticipating the future capacity to ambulate among this children. However, the validation of this score chart should be tested in other subjects before clinical practice application. Furthermore, the meta-analysis from this thesis confirmed that the prognostic predictors for ambulation among

worldwide children with CP were sitting independently at the age of two years, absence of visual impairment, absence of intellectual disability, and absence of epilepsy or seizure.

This thesis are potentially beneficial in the long-term treatment and rehabilitation of children with CP in Thailand. Therefore, in determining therapeutic plans and rehabilitation goals for children with CP, these factors should be taken into consideration in order to encourage children with CP to walk with their full potential, especially sitting independently at 2 years. Although evidence suggests that the likelihood of walking independently in children who sitting independently after 2 years is less than children who are able to sit independently at 2 years, children in the former group are still able to practice walking independently since there are other prognostic predictors for ambulation.

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