

## Corrigendum to: Proton and carbon ion radiotherapy in skull base chordomas: a prospective study based on a dual particle and a patient-customized treatment strategy

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Corrigendum to Iannalfi et al. Proton and carbon ion radiotherapy in skull base chordomas: a prospective study based on a dual particle and a patient-customized treatment strategy. *Neuro Oncol* (doi: <https://doi.org/10.1093/neuonc/noaa067>), 2020 Sep 29;22(9):1348-1358.

The authors of this article wish to correct several errors:

In the Results section of the Abstract, the median follow-up time of 44 (range, 6–87) months is wrong; the correct number is 49 (range, 6–87) months, as written later in the text.

At the beginning of the Materials and Methods section, the time point of treatment initiation is written as November 2012; this should be November 2011.

In [Table 4](#), in the first column listing the studies, the reference number associated with Noel, 2005, should be 40, and below that, the reference number associated with Mizoe, 2009, should be 41. In the seventh column, under “LC (%)” for the study by Weber, 2016, the 5-y value should be 75.8. [Table 4](#) is shown here in corrected form:

**Table 4** Published series of skull base chordomas treated with particle radiotherapy

Study (Institution)	Radiation Type	RT Dose (GyRBE)	Patients (number)	Follow-up Months (median)	GTV	LC (%)	OS (%)
Hug, 1999; LLMUC <sup>4</sup>	Ph + P	TD 71.9 median (66.6–79.2, range) Dfp: 1.8	33	32.2	9%: 0 to ≤15 mL 12%: >15 to ≤25 mL 79%: >25 ml	3-y: 67 5-y: 59	3-y: 87 5-y: 79
Munzenrider, 1999; HCL-MGH <sup>10</sup>	Ph + P	TD: 66–83 range Dpf: 1.8–1.92	169	41	NR	5-y: 73 10-y: 54	5-y: 80 10-y: 54
Noel, 2005; CPO <sup>40</sup>	Ph + P	TD: 67 median (60–71, range) Dpf: 1.8-2	100 (1993–2002)	31	23 cm <sup>3</sup> (median)	4-y: 53	4-y: 90
Mizoe, 2009; (NIRS) <sup>41</sup>	C	TD: 48–60.8 range Dpf: 3–3.8	33	53 (mean)	NR	5-y: 85 10-y: 64	5-y: 88 10-y: 67
Uhl, 2014; (GSI) <sup>9</sup>	C	TD: 60 median (54–70, range) Dpf: 3	155	38	NR	3-y: 82 5-y: 72 10-y: 54	3-y: 95 5-y: 85 10-y: 75
Weber, 2016; (PSI) <sup>11</sup>	P	TD: 72.5 mean Dpf: 1.8-2	151	50 (mean)	35.4 cm <sup>3</sup> (mean)	5-y: 75.8 7-y: 70.9	7-y: 72.9
Fung, 2018; (CPO) <sup>12</sup>	Ph + P	TD 68.4–73.8 range Dpf: 1,8	106 (2006–2012)	61	25 cm <sup>3</sup> (mean)	4-y: 78.3 5-y: 75.1	4-y: 90.2 5-y: 88.3
Present Study CNAO	P or C	P:TD: 74 median (72–74, range) Dpf: 1,8-2 C: TD: 70,4 Dpf: 4,4	135 70 P 65 C	44	7 cm <sup>3</sup> (median) P: 3,5 cm <sup>3</sup> (median) C: 12,9 cm <sup>3</sup> (median)	P: 3-y: 89 5-y: 84 C: 3-y: 77 5-y: 71	P: 3-y: 93 5-y: 83 C: 3-y: 90 5-y: 82

**Abbreviations:** C, carbon ion therapy; Gy, gray; LC, local control; OS, overall survival; P, proton therapy; Ph, photon therapy; RBE, relative biological effectiveness; TD: Total Dose; Dpf: dose per fraction. NR: not reported; GTV: Gross Tumor Volume; CTV: Clinical Target Volume; GSI: Society for Heavy Ion Research (Darmstadt, Germany); NIRS: National Institute for Radiologic Sciences (Chiba, Japan); HCL-MGH = Harvard Cyclotron Laboratory and Massachusetts General Hospital (Bost, USA); LLUMC = Loma Linda University Medical Center (Loma Linda, USA); PSI = Paul Scherrer Institut (Villigen, Switzerland); CPO = Centre de Protontherapie d'Orsay (Orsay France); CNAO: National Center for Oncological Hadrontherapy (Pavia, Italy)